Final
Response to Comments to the Proposed HWC MACT Standards

Volume III:

New CEMS

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ABSTRACT

The U.S. Environmental Protection Agency (EPA) proposed Hazardous Waste Combustor (HWC) MACT standards for hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns on April 19, 1996. (61 FR 17358) In addition, the Agency published five notices of data availability (NODAs) prior to finalizing the HWC MACT standards. The Agency received numerous comments on the proposed rulemaking and the subsequent NODAs. The five volumes of this document provide the Agency's response to these comments.

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Volume III - New Continuous Emissions Monitoring Systems

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General CEMS	cem1gen.wpd
Total Mercury CEMS	cem2hg.wpd
Multi-metal CEMS	cem3mm.wpd
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Particulate Matter CEMS	cem5.wpd
CEMS Quality Assurance	cem6qa.wpd
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Introduction

The U.S. Environmental Protection Agency (EPA) proposed Hazardous Waste Combustor (HWC) MACT standards for hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns on April 19, 1996. (61 FR 17358) In addition, the Agency published five notices of data availability (NODAs) prior to finalizing the HWC MACT standards:

- August 23, 1996 (61 FR 43501), inviting comment on information pertaining to a peer review of three aspects of the proposed rule and information pertaining to the since-promulgated "Comparable Fuels" rule (see 63 FR 43501 (June 19, 1998));
- January 7, 1997 (62 FR 960), inviting comment on an updated hazardous waste combustor data base containing the emissions and ancillary data that the Agency used to develop the final rule;
- March 21, 1997 (62 FR 13775), inviting comment on our approach to demonstrate the technical feasibility of monitoring particulate matter emissions from hazardous waste combustors using continuous emissions monitoring systems;
- May 2, 1997 (62 FR 24212), inviting comment on several topics including the status of establishing MACT standards for hazardous waste combustors using a revised emissions data base and the status of various implementation issues, including compliance dates, compliance requirements, performance testing, and notification and reporting requirements; and
- December 30, 1997 (62 FR 67788), inviting comment on several status reports pertaining to particulate matter continuous emissions monitoring systems.

The Agency received numerous comments on the proposed rulemaking and the subsequent NODAs. This document provides the Agency's response to comments on issues related to Continuous Emissions Monitoring Systems (CEMS) for the MACT standards. It is the third of five volumes providing response to comments on the rulemaking. The other four volumes are:

- Volume I. Standards
- Volume II. Compliance
- Volume IV. Permitting
- Volume V. Waste Minimization

The comments are grouped into common issues; and, where appropriate, the Agency addresses several similar comments from one or more commenters in a single response. For each specific issue, this document provides the comments word-for-word as written, a summary of the comments, and the Agency's response to the comments. Note that comments dealing with multiple issues have been broken up and addressed in separate parts of the document.

General CEMS

1. <u>General CEMS Requirements</u>

<u>Comment</u>

CEM1.001(071)(a) CEMs are expensive and unwarranted for many materials. CO, THC, and O_2 technology has developed reliable CEMs, but the other CEMs required in the rule are in the developmental stage and probably cannot perform to the quality levels required in the rule.

CEM1.006(101)(a) Many of the CEMs discussed in the proposed rule are not available at this time, are not proven reliable and capable of providing data on an ongoing basis for extended period of times, or may be unsuitable to a particular facility's operating environment;

CEM1.006(101)(c) However, many of the CEMs discussed in the proposed rule are not available at this time, are not proven reliable and capable of providing data on an ongoing basis for extended period of times, or may be unsuitable to a particular facility's operating environment. Examples of problematic or undeveloped CEMs include those for mercury, metals, HCl and PM. Until these CEMs are perfected, the feedstream and operating limits are reliable controls if these are properly correlated with stack emissions performance testing and trial bums.

CEM1.016(114)(a) Chapter 2. Continuous Emission Monitors Introduction Incinerator process performance monitoring is currently accomplished by measuring a variety of input, output, and process system parameters and comparing the measured results to the acceptable operating range or limit which is established from the results of an approved trial burn to ensure emissions from the process are within limits. Acceptability of emissions is based upon health-risk or technology-based considerations. Because of concerns raised by stakeholders, a continued interest in improving the continuous, real-time measurement technology has resulted in increased development and demonstration of continuous emission monitors. The development and implementation of functional monitoring technology is critical to gaining greater public confidence in the safety of incineration.

CEM1.016(114)(d) CRWI is concerned that the results of emission monitor demonstration tests funded by USEPA have not been fully reviewed at this time under the coordination effort of the ASME Subcommittee. Reports of tests are due shortly for demonstrations of multi-metal, mercury, particulate, and organic constituent monitors. CRWI members believe these demonstration programs are preliminary, at best, since they have been conducted over a short period of time. General concerns and suggestions from potential users of these CEM technologies participating in the ASME coordination effort are shown in Table 2.1.

CEM1.016(114)(e) TABLE 2.1 Concern: There is a significant data gap resulting in lack of confidence in the use of CEMs for compliance assurance demonstration. More research is needed before a CEM should be a requirement for several parameters. This concern includes field ruggedness and maintenance requirements. Uncertainty in CEM measurements used for demonstration of compliance has not been quantified. Suggestion: Users support feasibility and ruggedness demonstration studies at different incinerators with different waste matrices and wet APC equipment. CRWI supports certification of CEMs through a process similar to that used in Germany

(TUV Certification). CRWI supports incorporation of “uncertainty” of measurement by the CEM into the allowable permit limit when compliance with that limit is demonstrated by CEMs.

CEM1.021(117) 22. ISSUE: Existing Sources. Rule Cite: The EPA has proposed that a facility be in compliance with these standards within three years after the date of publication of the final rule in the Federal Register. (Proposed Rule, 61 FR 17416, Part Five, Paragraph I.A.) Comment: DoD expresses concern that while allowing three years for a facility to be in compliance with the MACT standards seems adequate, some of the technologies for demonstrating compliance (i.e. particulate matter (PM) and multi-metal CEMS) are not yet approved by EPA. Requiring facilities to comply with technology standards for which the technology is not yet approved and readily available places an undue burden on the facilities. Recommendation: DoD concurs with EPA’s proposal that the deadline for compliance with the MACT standard be set at three years after promulgation, the maximum allowed by CAA §112. However, DoD also recommends that EPA establish the compliance deadline for the CEMS requirements at three years from the time CEMS technology capable of accurately monitoring all of the referenced pollutants is EPA approved and available.

CEM1.024(124) DOE shares many of the same concerns voiced by other stakeholders relative to the use of continuous emissions monitoring systems and their availability/reliability....

CEM1.030(127)(a) As a reference point, Ciba suggests that EPA consider the CEMS regulatory requirements affecting its incinerator operations in Switzerland. Ciba operates a waste solvent incinerator in Schweizerhalle, which has been equipped since 1992 with CEMS for PM, THC, SO_2, NO_2, NH_3, CO, CO_2 and O_2. It also operates a new rotary kiln hazardous waste incinerator in Basel equipped with PM, THC HCl, SO_2, NO, NO_2, NH_3, CO, O_2, and water vapor CEMS.

CEM1.033(129)(a) CONTINUOUS EMISSIONS MONITORING SYSTEMS (CEMs) INTRODUCTION Background Hazardous waste combustor (HWC) process performance monitoring is currently accomplished by measuring a variety of input, output, and process system parameters and comparing the measured results to the acceptable operating range or limit which is established to ensure that emissions from the process are acceptable. Acceptability of emissions is based upon health risk or technology based considerations. Because of concerns raised by local community residents in the vicinity of many thermal devices treating hazardous waste, a continued interest in improving the measurement technology that provides continuous performance monitoring of an increasing number of parameters, including individual chemical constituents, has resulted in increased development and demonstration of continuous emission monitors. Operators of hazardous waste combustors (HWC) encourage this development of increasingly sophisticated emissions monitoring strategies for hazardous waste combustors. The development and implementation of functional monitoring technology is critical to gaining greater public confidence in the safety of waste combustions.

Personnel from EPA and the ASME Research Committee on Industrial and Municipal Wastes (RCIMW) have participated in recent RCIMW CEM Subcommittee efforts to coordinate CEM development and use. A workshop on continuous performance assurance relative to metal emissions held in 1993, became the basis for this coordination effort since the workshop concluded:

- Compliance procedures using waste feed rates for metals control were problematic.

- The focus should be on emission based standards and requirements and the development of alternatives to feedrate limits.
- Continuous (not necessarily realtime) emission monitors (CEMS) are an important need.
- Time is a major issue (e.g., averaging time, time delay, exposure time acute and chronic).

Current Situation, Concerns and Suggestions for Improvement

The results of emission monitor demonstration tests funded by EPA have not been fully reviewed at this time by the RCIMW CEM Subcommittee. Reports of tests are due shortly for demonstrations of multimetals, mercury, particulate and organic constituent monitors. Industry members believe these demonstration programs are preliminary, at best, since they have been conducted over a short period of time. Potential users of these CEM technologies participating in the ASME coordination effort have voiced the following general concerns and suggestions:

Concern: There is a significant data gap resulting in lack of confidence in the use of CEMS for compliance assurance demonstration. More research is needed before a CEM should be a requirement for several parameters. This concern includes field ruggedness and maintenance requirements. There is unknown uncertainty in CEM measurements used for demonstration of compliance.

Suggestion: Users support feasibility and ruggedness demonstration studies at different hazardous waste combustors with different waste matrices and wet APC equipment. Certification of CEMs through a process similar to that used in Germany (TLTV Certification) should be considered. Incorporation of “uncertainty” of measurement by the CEM into the allowable permit limit when that limit is demonstrated by the CEMs should be done.

CEM1.033(129)(d) Suggested Approach HWC operators are supportive of the concept of using emission monitoring as a compliance and performance assurance tool. However, the users have a concern that the current state of development of the monitoring instrumentation has not reached the level of reliability necessary for the EPA to mandate the use of CEMs for particulate and mercury (Hg).

CEM1.042(141) B. The monitoring requirements are burdensome and impractical. The Agency has outlined several purported advantages of CEMS for combustion facilities: 1) CEMS are a direct measure of emissions and thus there are fewer assumptions to assure compliance; 2) CEMS are less intrusive at the facility than operating parameters and 3) there is only a need to monitor one emission parameter to assure compliance rather than multiple operating limits that are often relevant to more than one standard. 61 Fed, Reg. 17379. Yet, the implementation of CEMS in the proposed Combustor MACT does not achieve any of these advantages.

CEM1.047(143) Attachment 7b GCl Tech Notes, “Continuous Monitoring Requirements BIF Versus HWC”, June, 1996, Craig Cape.

Parameter	BIF Requirement	HWC Requirement

Hydrogen Chloride	No CEM Required	1. Interface Response Test, deviate <2% of limit. 2. Install and Check out. 3. Calibrate Error Test - included Response Time Test, deviate <2.5% of span. Requirement for O2 and moisture not mentioned. 4. Conduct 7 day CD/ZD Test, deviate <2.5% of span on 6 of 7 days.
Chlorine	No CEM Required	1. Install and check out. 2. Conduct Calibration Error Test, deviate <15% of reference. 3. Conduct interference response test, deviate <2% of limit. 4. Conduct 7 day CD/ZD Test.

CEM1.048(147) Requirement to Use CEMS The proposed HWC regulation requires the use of CEMS for particulate, mercury, HCl & Cl_2, and multimetals operational parameters. A PM CEMS is to be used to establish a compliance parameter for D/F, SVM and LVM emission standards. Such a requirement does not appear to be the intent of the Clean Air Act. In examining the outline of Section 7412, Hazardous Air Pollutants, we find the following:

(a) Definitions
(b) List of Pollutants
  (1) Initial list
  (2) Revision of list
  (3) Petitions to modify list
  (4) Further information
  (5) Test methods
  (6) Prevention of significant deterioration
  (7) Lead
(c) List of sources
  (1) General
  (2) Requirement for emission standards
  (3) Area sources
  (4) Previously regulated categories
  (5) Additional categories
  (6) Specific pollutants (with reference to d(2) & d(4)
  (7) Research facilities
  (8) Boat manufacturing
(d) Emissions Standards
  (1) General
  (2) Standards and methods
  (3) New and existing sources
  (4) Health threshold

Looking at the CAA from the viewpoint of a person tasked with executing the desires of Congress, it would appear that (a) defines the main terms, (b) fists the pollutants of concern and changes to that list (c) shows which sources are affected, and (d) shows what the sources must do to comply, and so on.

The rest of the Act follows through with a similar format. Section (e) is the schedule for standards and review. Section (f) is the standard to protect health and environment, which notably includes a specific reference to include "...negative health or environmental consequences to the community of efforts to reduce such risks." Section (g) addresses modifications. The rest continues in this same vein.

However, Section (b) is entitled "List of Pollutants" and each sub-paragraph is clearly related to the HAP list and revisions to the list. Sub-paragraph (b)(5) entitled "Test Methods", reads as follows: "The Administrator may establish, by rule, test measures and other analytic procedures for monitoring and measuring emissions, ambient concentrations, deposition, and bioaccumulation of hazardous air pollutants." Section (c) lists certain specific categories or pollutants to be addressed. Sub-paragraph (c)(6) addresses specific pollutants that affect cement kilns and other HWCs and also specifically references sub-paragraphs (d)(2) and (d)(4). Sub-paragraph (d)(2) deals with the implementation of the standards and methods to achieve those standards.

Nowhere in this section, paragraphs, or sub-paragraphs are continuous emissions monitors mentioned. There are specific references to a number of generic methods for reducing or eliminating emissions. It would however, be a long stretch to take words from (b)(5) and link them to (d)(2) requirements to establish the most expensive and difficult compliance approach: continuous emission monitors, especially when monitoring cannot control or when other control methods may be better suited to any specific application. It is an even longer stretch considering these monitors don't yet exist.

CEMS Certifications: The explanation of the proposed CEM regulation begins on FR17427 of the preamble and is detailed in the regulations beginning on FR17495. Part of the justification for the EPA's promotion of the CEMs is that it is difficult and expensive to perform proper feedstream analyses. EPA cites the fact that several cement kilns and lightweight aggregate kilns have been fined for inadequate feedstream analysis plans in support of their justification. In comparison, feedstream analyses will be much less expensive than and many times less prone to operational problems than the CEM compliance even more troublesome.

CEM1.060(167)(b) Based on its past experience with CEMs, even those which have been commercially available for several years, BCP believes that CEMs related to the proposed parameters to be regulated are for the most part unproven and, in some cases, provide extremely unreliable data. Even in situations when a monitor has undergone extensive testing, the situations encountered in a controlled testing environment cannot sufficiently simulate the hostile and rigorous conditions under which the monitor must operate for extended periods of time, nor do these situation provide any real idea as to the durability of such a device.

CEM1.061(170) CKRC supports the Agency's policy of promulgating standards that are reflective of scientific advances. CKRC also supports the Agency's investigation and support of the development of continuous emissions monitoring (CEM) technologies. We are continually searching for improved methods of demonstrating the safety of our operations to the local community and the public at large. We are concerned, however, with the proposed requirement to install several *unproven* CEM devices at this time.

CKRC believes that these units are not ready for “prime time” and that the required use of these developmental technologies will prove to be counterproductive. We believe that the Agency has not carefully weighed the negative aspects of requiring technologies at hazardous waste combustion facilities that are not ready for use. These facilities operate under enormous public and regulatory scrutiny. Requiring monitoring devices that have questionable reliability, and have not been demonstrated to meet the rigorous demands of this rule would undoubtedly lead to inaccurate data, misinformation, and unwarranted regulatory enforcement actions. That, in turn, would result in a decrease in public confidence in the safety of our operations based on incorrect information.

CEM1.070(181) I. Eastman Generally Supports the Use of CEMS. EPA is proposing that Continuous Emission Monitoring Systems (CEMS) be used to monitor CO, THC, O_2, Hg and PM emissions from hazardous waste combustors. Eastman believes that CEMS generally provide operating and compliance advantages for both the operating facility and the Agency and, therefore, supports their development and use. Reliable CEMS, in the proper regulatory and enforcement context, can provide a high degree of assurance that a facility is operating in compliance with applicable emission standards and could eventually result in more cost effective operations (e.g. less testing, fewer operational monitors and data-keeping, etc.).

However, for CEMS to provide real benefit, they must be readily available so that they can be installed and operational within the 3 year compliance period, accurate and reliable, maintainable with minimum downtime, and available at reasonable costs.

CEM1.078(183) 1) There is a significant data gap resulting in lack of confidence in the use of CEM’s for compliance assurance demonstration. More research is needed before a CEM should be a requirement for several parameters. This concern includes field ruggedness and maintenance requirements. Uncertainty in CEM measurements used for demonstration of compliance has not been quantified.

CEM1.089(212B) 14.2 Continuous Emissions Monitor Systems

A. General

In the preamble to the proposed rule (Part Five, II, A, pg. 17417), EPA discusses the hierarchy of monitoring options and explains that the use of CEMS to measure regulated constituents is most preferred. In the rule (proposed 40 CFR 60 Appendix B, pg. 17495), EPA describes performance specifications for these CEMS. EPA’s decision to use CEMS is apparently based, at least in part, on the results of the CEM testing conducted by EER at Lafarge. Lafarge cites the following deficiencies with the CEM results from the EER testing:

i. CEMS durability is not tested for a sufficient time period. The EER report claims to test the “actual field performance” of the five CEM test systems. Since wet process cement typically prove to be the harshest of operating environments for extractive monitors, an appropriately designed CEMS field test could yield valuable evidence of their suitability for sustained compliance monitoring. However, the limited duration of EER’s testing does little to demonstrate the monitor’s ability to provide continuous, accurate a reasonable period of time.

Even during the limited testing period, only 1 monitor of 5 demonstrated the level of performance required under the proposed MACT rule (40 CFR 63, Appendix to Subpart EEE). The PAH monitor was unable to collect data downstream of the kiln system's ESP. The PIC mass spectrometer was damaged in transit, and although the instrument could be repaired to operable form, a vacuum leak, which compromised accuracy, could not be repaired in the field (i.e., in the same environment a regulated facility would be required to maintain the instrument). The Verewa mercury CEM appeared to operate well, but an instrument response exceeding 125% of the average reference method measurements does not meet quality specifications required of a compliance monitor. While one PM CEMS operated adequately, the other failed due to pluggage of the sampling line.

ii. CEMS accuracy is not confirmed by EPA Reference Method comparison. In Section 4.1 of their report, EER states that CEM accuracy was assessed through comparison with EPA Reference Methods that were conducted simultaneously with monitor operation. No reference method was performed following the codified performance specifications in 40 CFR Part 60 or the new/revised methods in EPA's proposed MACT rule (40 CFR 63, Appendix to Subpart EEE). For PM and mercury CEMS, the correct reference methods were used, but an insufficient number of comparative runs were conducted for meaningful QA/QC analysis. By proposing rigid QA/QC performance criteria for MACT compliance instrumentation, EPA should be subject to demonstration of instrument viability under the same criteria, else the Agency would be guilty of setting a double standard.

CEM1.090(212B) C. Organic Emissions Mass Spectrometer

i. PIC CEMS cannot measure particulate entrained organic compounds and therefore is not suitable for regulatory compliance. Eli EcoLogic's CIMS 500 mass spectrometer system screens particulate prior to measurement and therefore cannot measure products of incomplete combustion (PICs) that absorb onto particulate surfaces. Previous test data show that a significant fraction of dioxin and furan congeners can absorb onto the surface of cement kiln dust. Since other semi-volatile organic compounds are likely to also absorb onto CKD, this monitor will provide incomplete results. The multiple organic absorption sites provided by a cement kiln's large quantity of reentrained raw material makes this monitor's analytical deficiency a critical reason for limiting its MACT implementation in cement kiln systems

ii. Without performance method validation or rigorous instrument calibration, mass spectrometer measurements have not satisfied required performance accuracy criteria.Instrument calibration was performed using only a single standard of 1 ppm benzene. Although vendor testing in the laboratory supports the sufficiency of this calibration method, the instrument's damage in transit and unresolved vacuum leak suggest that the single point calibration is not suitable for the range of operation seen in the field. Additionally, the 1 ppm standard is nearly an order of magnitude larger than the kiln's average benzene readings. Without comparison to standard method QA/QC procedures, the accuracy of this monitor is not suitable for consideration in development of the MACT regulation. D. Polycyclic Aromatic Hydrocarbon (PAH) Analyzer I. A PAH CEMS unable to measure downstream of an ESP is not suitable for regulation implementation on cement kilns. The EcoChem PAS 1000e CEMS could not measure downstream of an ESP. Since ESPs are a predominant control device in cement kilns, this monitor should not be considered as an option for CEMS implementation under MACT.

CEM2.003(089) Continuous Emission Monitoring Systems We have concerns about the reliability and the availability of Hg and PM CEMS. We have yet to permit or know of a PM or Hg CEMS that is in operation in the State of Texas. No Hg or PM CEMS has ever been required. Even if EPA's demonstration program shows that the CEMs can comply with the performance specifications proposed in this rule, it does not mean that the CEMs will be readily commercially available. We are concerned, based on the problems. that occurred when CEMs were required under the BIF rule, that the limited number of suppliers will not be able to meet the demand for the universe of facilities affected by this rule within the time allowed. Our concern is not just limited to the availability of the CEMS. As the TNRCC experienced during the 1991 rush to comply with the BIF rules, there is a finite number of qualified contractors available to conduct stack tests, risk assessments, etc. The requirements of this rule may very well exceed the capacity of the State of Texas to allow a facility to meet its requirements within the proposed deadlines.

The final rule needs to provide allowances, on a case-by-case basis, which will enable States to grant a facility an extension to the compliance deadline to address the concerns discussed above.

CEM2.004(091)(a) Continuous emissions monitoring systems for mercury and particulate are commercially available. We support EPA's intention to require continuous monitoring of mercury and particulate emissions, given the toxicity and persistence of mercury, and the likely toxicity of particulate emissions from hazardous waste incinerators.

CEM2.005(093)(a) IV. CONTINUOUS EMISSIONS MONITORING SYSTEMS EPA is proposing to require the use of Continuous Emission Monitors (CEMsi for five (5) parameters: particulate matter (PM), mercury (Hg), oxygen O_2), carbon monoxide (CO), and total hydrocarbons (HC). Nepera believes that requiring the use of these CEMs in all cases is overly burdensome and unnecessary.

Nepera understands and agrees with EPA approach to use actual data rather than surrogate information whenever practicable and useful. However, there are several cases where the use of the CEMs is unreasonable.

Since compliance testing (including spiking of waste streams) by its nature is indicative of worst-case operating scenarios, units whose emission testing results are less than a certain threshold (such as ½ the numerical limit) should be allowed to use feedstream analysis data to prove compliance. This alternative would allow some flexibility and relief for operators without compromising human health and environmental protection.

CEM2.005(093)(c) For these reasons, CEMs should be REQUIRED only when proven, readily available, and necessary for day-to-day operational control. Not all of the CEMs proposed by EPA are readily available or proven for use in incinerator applications domestically. This is particularly true for PM and Hg monitors. In these cases, facilities should be allowed to use sampling/testing/operating controls to demonstrate compliance.

CEM2.006(094) 5. Continuous Monitoring. National Cement objects to EPA's proposal to require

CEMs for PK $HCl/C1_2$, LVM, SVM, and Hg because there has been insufficient research and testing to show that CEMs can be used to demonstrate compliance with these MACT standards. With respect to PM CEMS, EPA has not provided any information regarding vendors, cost, accuracy, reliability, or other specifications. Until PM CEMs have been satisfactorily tested in the United States, their use should not be mandated. Similarly, EPA has provided little or no technical information regarding $HCl/C1_2$. LVM, SVM, and Hg CEMS, these instruments remain completely unproven in the United States, and their use should not be required. In the cases where EPA currently has made use of CEMs optional, National objects to EPA's proposals to mandate, without further notice and comment use of CEMs if EPA should, in the future, determine that such use is feasible. Prior to promulgating a rule that requires use of new and novel technology, EPA should give notice that provides detailed technical specifications and testing results for the technology and thereby allow regulated facilities to fully assess the proposed technology and provide comment.

CEM2.007(097)(a) A. EPA's proposal to require hazardous waste combustion facilities to install and operate continuous emissions monitoring systems to demonstrate compliance with mercury and particulate matter emissions limits lacks valid technical or legal bases.

Reliable CEMs for CO, THC and oxygen are available, and Vulcan Chemicals has no objection to their use as appropriate elements of an overall compliance strategy. The measurement technology of these three instruments is well proven and has been field validated over more than ten years. However, proven and validated CEMs for particulate and mercury are not yet available, as they have not been proven to be effective or reliable on the variety of combustion applications that would be required to use, them under this MACT. (e.g., stack conditions that are wet, dry, hot, cool, etc.).

<u>Reference NSR report</u>.

The administrative record reflects that such devices are not reliable and have not been adequately "field tested." Indeed, EPA has admitted that it is only now undertaking field tests to determine if whether mercury and PM CEMS are properly required for use in compliance monitoring for hazardous waste combustors. The results of those EPA tests will not be available until after the close of the comment period for this proposed rule, and may not even be available prior to the projected date for issuance of the final rule. Until such data is available for public review and comment, the use of PM and Mercury CEMs should not be arbitrarily required. Vulcan Chemicals would not object to use of CEMs for other parameters, providing that (1) the CEM is no less reliable and accurate than current CEMs for CO, THC, and oxygen; and (2) the parameter that the CEM monitors is not subject to redundant monitoring (e.g., for particulates monitoring it is redundant to require both a PM CEM <u>and</u> feedstream monitoring for ash content).

Under these circumstances, EPA lacks a valid technical and legal basis for its proposal to force hazardous waste combustors to abandon existing, proven compliance monitoring systems, in favor of installing expensive, unproven, and potentially unreliable mercury and PM CEMS. Instead, existing, proven compliance systems should remain acceptable for use in demonstrating compliance with applicable emissions standards. Permissible alternative compliance systems should not be limited to feedstream monitoring, as proposed by EPA, because the feedstream monitoring options are overly restrictive.

CEM2.007(c) 4. Normal variations In sample matrices will significantly impact instrument responses, impacting compliance monitoring accuracy.

Another complication that needs to be addressed is that the sample matrix effect is significantly different for particulate and mercury than for CO, THC and O_2. It is well documented that the sample matrix effect significantly affects the instrument response. For example, the same amount of mercury in three different sample matrices may yield three different results. Hazardous waste incinerators' sample matrices can change daily based on the waste being burned, so reliable and meaningful results are doubtful. This factor alone should be sufficient to disqualify current CEM technology for particulate and mercury monitoring until it has advanced further.

CEM2.008(100) III. Continuous Emission Monitors for PM, Mercury, and THC Ciba believes the existing feed rate analysis and operating parameter control measures for mercury and PM are appropriate, conservative and adequate. EPA has made no finding that these systems are inadequate and has not shown that the proposed alternative (CEMS) are viable or justified. Ciba believes the CEM systems mandated in the proposed rule would introduce the potential for unjustified enforcement action based on false indications of emissions.

CEM2.009(101)(a) Many of the CEMs discussed in the proposed rule are not available at this time, are not proven reliable and capable of providing data on an ongoing basis for extended period of times, or may be unsuitable to a particular facility's operating environment;

CEM2.010(105) However, many of the CEMs (metals, mercury) discussed in the proposed rule are not commercially available at this time, or are not reliable and capable of providing data on an ongoing basis for extended periods of time. Until these CEMs are perfected, the feedstream and operating limits are reliable controls if these are property correlated with stack emission performance tests and trial burns.

CEM2.013(113) A. Continuous emission monitors ("CEMs") for PM and mercury are not a proven technology for cement kilns EPA is proposing that cement kilns use CEMs to monitor several pollutants. For PM and Hg, because CEMs for these pollutants have not been adequately tested, their inclusion in this rule is likely to be extremely costly and disruptive of normal cement production for some or all cement kilns. CEMs for mercury and PM have never been used in the United States and the industry is unfamiliar with their reliability, accuracy, and durability. [Footnote 56: Holnam supports the discussion in CKRC's comments regarding the cement industry's experience with CEMs.] In fact, EPA, apparently recognizing the untested nature of Hg and PM monitors, recently solicited proposals to conduct a demonstration project for CEMs for mercury and PM. See 61 FR 7232 (Feb. 27, 1996)) Unfortunately, the results of this demonstration project will not be available during the comment period, at least the results for Phase II, which is the long-term endurance test, perhaps the most critical aspect of the project. Thus, EPA is not only proposing a monitoring method the industry has never used, but also one that has not yet been adequately tested.

Holnam believes there are numerous potential problems with the application of these CEMs that have not been adequately tested to cement kilns. These problems include the moisture of gas streams in wet process kilns which creates unique problems in applying CEMs to these kilns. Also, the use of PM and Hg CEMs in concert with AWFCOs may cause operational problems, including stress on equipment, that is difficult to predict and quantify. Many of the potential problems associated with the use of these CEMs are discussed in more detail in CKRC's comments.

We are also concerned that the use of CEMs to verify compliance with an emission limitation that was developed (and previously demonstrated) by stack test alone may create significant compliance problems. Averaging periods in stack testing may tend to flatten out data in a way that is different from data provided by a CEMs using shorter averaging periods. In some cases a compliance test, measured over a period of time, may show compliance with a numerical standard, while the CEMs measured value, with shorter averaging time, shows noncompliance with the standard. More real operating data is needed to evaluate this correlation between stack test data and CEMs data. If such a correlation exists, the application of CEMs still effectively results in a more stringent emission limitation. If a correlation does not exist, the application is obviously not appropriate. As discussed earlier in our comments, EPA cannot separate an emission limitation from a monitoring method, if the monitoring method has an independent affect on the real limitation. If CEMs lowers the emission limitation, then the use of CEMs is a BTF technology and should be evaluated accordingly. Finally, EPA has not presented any data or arguments demonstrating that CEMs for PM and Hg will provide additional environmental protection over and above that provided by the large number of other operating monitoring requirements specified (e.g., gas flow, feed rates, etc.) Therefore, EPA is imposing a costly, untested technology without real evidence of its benefit for cement kilns. Given that certain CEMs on cement kiln as required in the proposed rule are untested technologies in the United States, Holnam does not believe it should be mandatory under the MACT rule. We do, however, believe that CEMs may have successful applications for certain kilns. Consequently, EPA should make CEMs an optional monitoring method. Kilns not employing CEMs would continue to monitor the larger number of parameters specified in the BIF rule. Kilns that do use CEMs would not be required to simultaneously monitor feed rate, gas flow rates and other interim operating parameters on an ongoing basis. This approach will encourage facilities to adopt the use of CEMs as soon as it is practically available as it will minimize the unnecessary collection of operating parameter data.

CEM2.015(114)(a) CRWI supports the use of continuous emission monitors (CEM) where the technology is reliable and cost-effective. However, CRWI does not believe that mercury and PM CEMs are sufficiently reliable at this time to require their use.

CEM2.015(114)(b) CRWI is supportive of the concept of using emission monitoring as a compliance and performance assurance tool. However, member companies share the concerns of other users that the current state of development of the monitoring instrumentation has not reached the level of reliability necessary for the EPA to mandate the use of CEMs for PM and mercury. The optional use of CEMs with trade-offs on other compliance procedures (e.g., feed restriction, compliance testing) is desirable as has been suggested in the proposed MACT Rule.

CEM2.016(114) Heated FID HC technology reliability is of concern while PM and Hg CEMs have little or no track record under USEPA regulations for reliability.

CEM2.017(114)(a) In an effort to gather a better understanding of the stage of development for mercury and PM CEMs, CRWI, CKRC, and CMA retained ENSR, who has extensive practical CEMs installation and calibration expertise, to expand on EPA's work in the Technical Support

Document, Volume 4. This work is still in progress (a final report will be submitted to EPA upon completion). However, preliminary results from this report are included below.

ENSR's in-depth search of the open literature did not provide any useful data, with less than 20 articles on Hg and PM CEMs published since 1993 out of about 1,400 on all types of continuous monitors. No references in the open literature or in the docket provided the level of documentation, needed to justify that these monitors are capable of measuring accurately at required low levels and maintaining sustained operation with minimal interruptions in service.

CEM2.018(116) C. Continuous Monitoring System(CMS)/Continuous Emissions Monitors
EPA is proposing to require the use of five continuous emission monitors (CEMS): carbon monoxide (CO), hydrocarbon (HC), oxygen (O_2), mercury (Hg), and particulate matter (PM) and to allow the use of CEMS for SVM, LVM, HCl, and Cl_2. Presently, for cement kilns and LWAKs, continuous emission monitoring of O_2 and CO (or HC) is required under the BIF rule (40 CFR 266.103(c)(1)(v)). (Proposed Rule, page 17379)

Medusa Corporation supports the finding in ENSR's Final Report on State-of-the Art CEMS:, prepared for the Coalition for Responsible Waste Incineration. The report concludes that the particulate matter (PM) and mercury (Hg) CEMS are clearly not ready for commercial use and much further development will be required before these analyzers can be used as proposed in the HWC MACT. Medusa Corporation opposes EPA requiring PM and Hg CEMs for demonstration of compliance with the HWC MACT proposed rule.

CEM2.019(117)(a) Under the revised rule, EPA proposes the use of additional continuous emissions monitors (CEMS) to quantify mercury, particulate matter, semivolatile metals, low volatility metals, hydrogen chloride, and chlorine in HWC stack gas. We believe that the additional CEMS, which in some cases consist of unproven technology, are unnecessary and place a significant operational and economic burden on HWC operators.

CEM2.019(117)(b) 8. ISSUE: Compliance Monitoring Requirements. Rule Cite: CEMS for CO, O_2, and uncombusted hydrocarbons (HC) that are currently required for incinerators will be supplemented with similar requirements for mercury (Hg) and particulate matter CEMS. Additionally, EPA encourages monitoring for semi-volatile and low-volatility metals (SVM and LVM) as well as HCl/Cl_2. (Proposed Rule, 61 FR 17419, Part Five, Paragraph II.C.)

Comment: DoD installations will be conducting extensive RCRA trial burn testing of incineration systems in order to characterize stack emissions in great detail. Data which is collected during these trial burns will be used to identify the operating parameters under which these facilities will meet the proposed MACT standards. Continuous monitoring for Hg, SVMs, LVMs, and HCl/Cl_2 would be redundant and excessive to implement for DoD facilities, most of which have a short, finite operating life (the expected operating life of a DoD HWC facility is from two to five years). CEMS for these species are tot well established in terms of technical standards, reliability, ease of use, maintenance, and overall reliability/accuracy. DoD believes that uncertainties that EPA has regarding the effectiveness of CEMS technology to Hg and organic products of incomplete combustion (PICS) should be resolved by data collection during well designed trial burns, not by requirements for complex, inefficient, and potentially unfeasible research-type continuous monitoring stipulations.

Recommendation: EPA eliminate the heed for certain CEMS (SVM, LVM, Hg, HC and HCl/Cl_2) by allowing the use of detailed trial burn data in order to establish operating conditions at which incinerators will meet MACT. (e.g. afterburner temperature residence time, and pressure drops that allowed the incinerator to meet MACT during trial burns.)

CEM2.022(122) 8. Director should be able to waive certain CEM and AWFCO requirements if other control measures are included at the facility which are as protective as the rule requirements.

If a facility demonstrates adequate feed rate controls on metals or ash, they should be able to be released from CEM requirements for Hg and PM in the stack, which in these cases adds complexity and cost with no additional environmental benefit.

CEM2.024(128)(a) Continuous Emissions Monitors EPA's proposal to require hazardous waste combustion facilities to install and operate continuous emissions monitors (CEMS) to demonstrate compliance with mercury and particulate matter (PM) emissions limits lacks valid technical or legal bases. Proven and validated CEMs for PM and mercury do not exist, and until data establishing otherwise are provided for review and comment, the use of these CEMs should not be arbitrarily required. Alternatively, EPA should allow some other methods of continuous sampling to be used until such time as CEMs are made available.

CEM2.024(128)(b) IV. Continuous Emissions Monitoring Systems A. EPA's proposal to require hazardous waste combustion facilities to install and operate continuous emissions monitoring systems to demonstrate compliance with mercury and particulate matter emissions limits lacks valid technical or legal bases.

Reliable CEMs for CO, HC and oxygen are available, and CMA has no objection to their use as appropriate elements of an overall compliance strategy. The measurement technology of these three instruments is well proven and has been field validated over more than ten years. However, proven and validated CEMs for particulate and mercury are not yet available, as they have not been proven to be effective or reliable on the variety of combustion applications that would be required to use them under this MACT. (e.g., stack conditions that are wet, dry, hot, cool, etc.). CMA, in cooperation with two other industry associations, has commissioned a state-of-the-art review of PM and mercury CEMs, which will be submitted to the docket under separate cover highlights of the study are discussed below.

The administrative record reflects that such devices are not reliable and have not been adequately "field tested." Indeed, EPA has admitted that it is only now undertaking field tests to determine whether mercury and PM CEMS are properly required for use in compliance monitoring for hazardous waste combustors. The results of those EPA tests will not be available until after the close of the comment period for this proposed rule, and may not even be available prior to the projected date for issuance of the final rule. Until such data are available for public review and comment, the use of PM and Mercury CEMs should not be arbitrarily required.

CMA would not object to use of CEMs for other parameters, providing that (1) the CEM is no less reliable and accurate than current CEMs for CO, HC, and oxygen; and (2) the parameter that the CEM monitors is not subject to redundant monitoring (e.g., for particulates monitoring it is redundant to require both a PM CEM and feedstream monitoring for ash content).

Under these circumstances, EPA lacks a valid technical and legal basis for its proposal to force hazardous waste combustors to abandon existing, proven compliance monitoring systems, in favor of installing expensive, unproven, and potentially unreliable mercury and PM CEMS. Instead, existing, proven compliance systems should remain acceptable for use in demonstrating compliance with applicable emissions standards.

CEM2.025(128) 3. Normal variations in sample matrices will significantly impact instrument responses, impacting compliance monitoring accuracy.

Another complication that needs to be addressed is that the sample matrix effect is significantly different for particulate and mercury than for CO, HC and O_2. It is then documented that the sample matrix effect significantly affects the instrument response. For example, the same amount of mercury in three different sample matrices may yield three different results. Hazardous waste incinerators' sample matrices can change daily based on the waste being burned, so reliable and meaningful results are doubtful. This factor alone should be sufficient to disqualify current CEM technology for particulate and mercury monitoring until it has advanced further.

CEM2.027(129)(a) CEMs for mercury and particulate matter (PM) are required (EPA is accepting comments on allowing small, onsite units to waive using these two CEMS). There are commercially available CEMs to measure elemental mercury. For these instruments to measure total mercury, some sample preparation is necessary between the sample probe and the analyzer to convert all mercury compounds to elemental mercury. PM CEMs are commercially available in Germany with some manufacturers starting to offer units in the United States. Thus, it should appear that all required CEMs (CO, oxygen, THC, Hg and PM) are commercially available.

CEM2.027(129)(b) It is suggested that the final rule not require Hg, PM, HCl/chlorine, SVM or LVM CEMs to demonstrate compliance with the rule. However, some facilities will want to include these CEMs as soon as they are practically available.

CEM2.028(130)(a) 3. Mercury EPA should not require use of MM or Hg CEMS, but must allow operators the flexibility to choose between CEMs or operating parameter limits to ensure compliance with MACT emission limits (page 17427/2).

CEM2.029(139) FMC and FCC do not believe the additional continuous monitoring of mercury, hydrocarbons or particulate matter will be of any additional benefit for our operation.

FMC and FCC are opposed to continuous monitoring for particulate matter and mercury. The ability to continuously comply with the proposed standards is already demonstrated through wastefeed and emission testing programs. Furthermore, the process variables necessary to predict regulated emission levels are (or can be) monitored (i.e., stack gas CO, waste feed mercury, chlorides, semivolatile and low volatile metals, and ash) and results are available to demonstrate continuous compliance. All particulate matter measurements can be directly calculated by material balance using waste feed ash and metal data. Depending on the confidence limits chosen, compliance rates of > 99% can be demonstrated. Thus far, even the best CEMS can only demonstrate 95% reliability.

CEM2.030(141)(a) First, although CEMS are theoretically a direct measurement of compliance with the emissions standard, the proposed PM and Hg CEMS are not yet demonstrated. Instead, existing, proven compliance systems should remain acceptable for use in demonstrating compliance with applicable emissions standards. Permissible alternative compliance systems should not be limited to feedstream monitoring, as proposed by EPA, because the feedstream monitoring options are overly restrictive.

CEM2.030(141)(b) Lilly's RCRA permitted hazardous waste incinerators currently monitor a variety of parameters to insure compliance. For example, CEMS are used for certain parameters, such as CO and O_2, in combination with continuous monitoring of operating parameters such as combustion temperature, venturi pressure drop and APC water flow rates. This current monitoring scheme offers a low cost, practical means of controlling combustion and insuring proper APC performance, and provides the appropriate assurance that the facility is in compliance with the standards. The current means of monitoring already prevents incinerators from exceeding emission standards, and also allow facilities to have a predictable, consistently run combustion operation.

Therefore, monitoring particulates, metals, etc., in real time is not necessary. Indeed, the Agency acknowledges that operating limits also "continually assure the facility is meeting the standards at all times." 61 Fed, Reg. 17379. Because the current monitoring scheme can assure that a facility is achieving the standards, and the CEMS proposed in the Combustor MACT are neither commercially available, technically feasible nor cost effective, Lilly recommends that compliance monitoring for combustion facilities be retained under the current practices and requirement of RCRA.

CEM2.031(141)(a) Lilly strenuously objects, however, to EPA's proposal to require hazardous waste combustion facilities to install and operate mercury and PM CEMS. The administrative record reflects that such devices are not reliable and not been adequately validated "in the field." Indeed, EPA has admitted that it is only now undertaking field tests to determine whether mercury and PM CEMS are properly required for use in compliance monitoring for hazardous waste combustors. The results of those EPA tests will not be available until after the close of the comment period for this proposed rule, and may not even be available prior to the projected date for issuance of the final rule.

Under these circumstances, EPA lacks a valid technical and legal basis for its proposal to force hazardous waste combustors to abandon existing, proven compliance monitoring systems, in favor of installing expensive, unproven, and potentially unreliable mercury and PM CEMS.

CEM2.031(141)(c) J. Normal variations in sample matrices will significantly impact instrument responses, impacting compliance monitoring accuracy.

Another complication that needs to be addressed is that the sample matrix effect is significantly different for particulate and mercury than for CO, THC and O_2. It is well documented that for PM and Hg the sample matrix effect significantly affects the instrument response. For example, the same amount of mercury in three different sample matrices may yield three different results. Hazardous waste incinerators' sample matrices can change daily based on the waste being burned, so reliable and meaningful results are doubtful. This factor alone should be sufficient to disqualify current CEM technology for particulate and mercury monitoring until it has advanced further.

CEM2.038(145)(a) § 63.1210 - Monitoring Requirements Reynolds does not support the use of PM or Hg CEMS to monitor emissions for compliance purposes. Based on the information provided in the *Background Information Document (BID), Volume IV Compliance with the Proposed MACT Standards,* Reynolds does not believe that reliable and affordable CEMS for mercury and particulate matter exist.

In the conclusion section of the mercury discussion provided in the BID, EPA states "...at this point little field testing has taken place in the U.S. A demonstration program with field testing of the CEMS against EPA reference methods will be required in this country in order to ensure the successful application of these monitors to emission monitoring for compliance on hazardous waste burning facilities" (emphasis added). Reynolds believes it is unreasonable for EPA to require operators of hazardous waste combustors to install technology that has not been demonstrated against EPA reference test methods. Data obtained will be meaningless and unreliable and can not be used to demonstrate compliance against the proposed standard for enforcement purposes. We support the Hg CEMS waiver provision provided in Section 63.1210(a)(3)) and encourage EPA to allow operators the flexibility to select whether CEMS or operating parameter limits will be used to demonstrate compliance.

CEM2.040(148) Continuous Emissions Monitoring The Agency is proposing to require that cement kilns demonstrate compliance with the MACT standards through the use of continuous emission monitors ("CEMs"). Many of emission parameters that will be required to be measured by CEMs that are not reliable, have never been demonstrated on cement kilns, and in one instance, is not available within the current U.S. market.

CEM2.042(157) 3) The requirement to install mercury and particulate matter continuous emission monitors (CEMS) lacks valid technical and legal basis. Installation of these CEMS should be a compliance option and not a requirement. The mercury and particulate matter CEMS have not been widely used in the United States and have not been proven to be reliable at this point in time.

CEM2.044(170) D. The Proposed Requirements For Compliance Monitoring Systems (CMS) And Continuous Emissions Monitoring (CEMs) Certifications Are Problematic Compliance Monitoring Systems The HWC MACT proposal significantly alters the compliance monitoring systems from what facilities currently use for compliance under the BIF rule (Attachment 8). Among the most significant changes is the proposed mandated use of CEMS for emissions not previously monitored on a continuous basis, including PM, Hg, Cl_2, and HCl. (61 FR 17417-17444)

CKRC is supportive of using compliance monitoring systems to keep the public apprized of facility operations, better educated regarding actual emissions, and fully informed that the facility is operating in a manner protective of human health and the environment. However, the proposal's compliance monitoring scheme is greatly dependent on yet-to-be-developed CEMS, conflicting and/or inappropriate standard-setting requirements, and inadequate compliance methods. [Footnote 193: Specific details of these compliance system difficulties are described in other sections of these comments.]

Thus, CKRC is opposed to this significant change in the CMS due to the fact that none of the proposed CEMS has demonstrated a capability to operate effectively on a cement kiln in accordance with the operating conditions EPA has proposed. They have not even passed the required Method 301 validation testing protocol as equivalent methods. Hence, any limitation set for CEMS monitoring is inappropriate. If the reference method and CEMS measure different constituents, then developing a limit using the reference method database is totally wrong and unenforceable. Further, the proposal calls for different and additional averaging periods for the continuous monitoring requirements. Multiple limits are inappropriate unless they are set with full appreciation, understanding and treatment of the effect multiple restrictions have on the likelihood of compliance with data-derived (statistically set) emissions limits. Therefore, it is likely that the compliance monitoring system as proposed will be subject to many errors, limited accuracy, and significant "downtime."

CKRC is concerned that these unavoidable occurrences will inhibit the proposal's intentions to better assure the public about a facility's protectiveness and actually result in decreased public trust in the safety of our facilities' operations. CKRC believes it is more practical to implement fewer, more reliable and proven compliance monitoring mechanisms at a facility rather than require every potential mechanism on a facility -- regardless of the stage of development or the impact on other systems. As discussed in other sections of these comments, EPA can encourage the development and installation of alternative compliance measures such as CEMS by providing impacted facilities with adequate incentives including cost savings or testing and operating limit trade-offs. The quality of information received from the proven and appropriate mechanisms is more valuable in assuring the public that a facility is in compliance with protective standards than is t he appearance of a massive, and complicated, compliance monitoring system that provides either skewed or meaningless data and information.

<u>CEMs Certifications</u>

While CKRC is aware of ongoing Agency activities in an attempt to validate CEMs technologies, we provide the following preliminary comments:

Under the BIF rule, CEMs are required for oxygen, carbon monoxide, and total hydrocarbons (40 CFR 266, Subpart H). The proposed addition of requirements for continuous emissions monitors on particulates, metals, mercury, hydrogen chloride, and chlorine (61 FR 17417-17444) presents numerous technical and compliance difficulties as many of them are not yet commercially available and/or have not been proven to work effectively on a cement kiln device.[Footnote 194: Detailed discussion of these difficulties is provided in other sections of these comments.] However, in addition to these fundamental technical problems, the certification of these CEMs presents numerous implementation difficulties.

CKRC is supportive of the concept of using continuous emissions monitoring as a compliance and performance assurance tool when appropriate, but is very concerned that the current state of development of the monitoring instrumentation has not reached the level of accuracy and reliability [Footnote 195: In conjunction with CMA and CRWI, CKRC contracted ENSR to perform "An Evaluation of the State-of-the-Art of Mercury and Particulate CEMs Required by the Proposed MACT Rule." We were unable to complete the final report by this comment deadline, but will transmit the final version under separate cover soon after the August 19, 1996 deadline.] necessary for EPA to mandate the implementation of these CEMs at cement kiln facilities. Instead, CKRC urges the Agency to modify the proposal and take a more practical approach. EPA's proposal should provide facilities with the option of using CEMs as an alternative to other required compliance procedures. Howe ver, in order to make this a workable alternative, EPA must ensure that the options provide interested facilities with real incentives (i.e., cost effectiveness, reduced testing) which currently are absent from the proposal.

CEM2.045(175) CONTINUOUS EMISSION MONITORING REQUIREMENTS The reliability of CEMs for such pollutants as mercury, particulates, and HCl have not been demonstrated within the industry. Glaxo Wellcome Inc. currently operates an HCl monitor at a solid hazardous waste incinerator which over the past year has been out of service for approximately 30% of the time. Glaxo Wellcome Inc. has also been unsuccessful in locating a service company (including the CEMs manufacturer) which can adequately provide maintenance and trouble shooting support for this systems. With similar requirements for CEMs for mercury and particulates, downtime for incineration systems would substantially increase. Companies would have to install duplicate systems to be able to maintain any acceptable reliability for their operations.

The need for CEMs for mercury, particulates, and HCl is also in question since emissions of these parameters would be required to be tested during stack testing. Such testing would be performed during incineration of waste representative of routine operations. In the event that the waste streams changed or in the event of a modification to the incinerator or air pollution control systems, such stack testing would be required to ensure that such changes do not result in an increase in emissions above an acceptable level.

In addition, operating parameters are established during trial burns to ensure that systems do not degrade over time that would otherwise result in an emission increase. As a result of the factors, Glaxo Wellcome Inc. recommends that CEM requirements for mercury, particulates, and HCl be removed from this proposal.

CEM2.046(177) 5. Current requirements for a permitted facility require CEMS for O_2 and CO and in some cases hydrocarbons (HC). The proposed MACT rule requires CEMS for the three listed above as well as for particulate matter (PM) and mercury (Hg). Several problems are associated with requiring these additional CEMS. The first concern is availability and reliability of these CEMS. Testing performed by the EPA was inconclusive as documented in the supporting volumes to the proposed MACT standard. Results from additional testing scheduled to begin in July and August 1996 for PM and Hg will not be completed before the comment period to this proposed standard is over.

CEM2.047(179) 5. Current requirements for a permitted facility require CEMS for O_2 and CO and in some cases HC. The proposed MACT rule requires CEMS for the three aforementioned parameters as well as for PM and Hg. Several problems are associated with requiring these additional CEMS (PM and Hg). The first concern is availability and reliability of these CEMS. Testing performed by the EPA was inconclusive as documented in the supporting volumes to the proposed MACT standard. Results from additional testing began in July and August 1996 for PM and Hg, however, these tests will not be completed before the comment period on this proposed standard is over. The position that reliable and cost effective CEMS will be available within the three year time frame allowed for compliance is unsubstantiated. Unless and until reliable and cost effective units are commercially available this portion of the rule should be placed on hold.

CEM2.049(181)(a) However, as is discussed below, Eastman is concerned that PM and Hg monitors are not yet sufficiently developed, and their use cannot be reasonably mandated. Rather, the Agency should make their use optional and provide incentives in the rule that would encourage facilities to choose the CEMS option and work to develop them to a satisfactory operational level.

CEM2.049(181)(b) CEMS for particulate matter (PM) and mercury (Hg), as well as for chlorine, multiple metals and organic compounds are either not available, not proven and/or not reliable. This statement is supported by the *Draft Technical Support Document for HWC MACT Standards, Volume IV.- Compliance with the Proposed MACT Standards.* In Sec.1.1.5 of this document, the conclusion for each one of these CEMS is "..compliance monitoring appears to be feasible.." No data is presented to show that compliance monitoring is feasible.

CEM2.049(181)(c) The CEMS proposed by the EPA have not been shown to be proven, reliable or cost-effective. EPA should not require technology that only "appears to be feasible."

III. Continuous Emission Monitoring Systems for Mercury and Particulate Matter Should Be Optional

In the proposed MACT rule, EPA has established emission standards for a number of parameters and has identified two basic mechanisms for demonstrating compliance with those standards on an on-going basis; (1) a continuous emission monitoring system (CEMS), or (2) limits on operating parameters. While EPA details each of these monitoring options, it proposes to require CEMS monitoring for mercury, particulate matter, carbon monoxide, oxygen and total hydrocarbons.

CEM2.049(181)(d) However, as is discussed in other comments, Eastman does not believe that mercury and particulate matter CEMS are yet sufficiently developed and proven to warrant a requirement that they be widely applied on all combustion units.

Eastman is also not convinced that CEMS are necessary to insure good operational control. Eastman believes that careful control of operating and feedrate parameters, based on levels demonstrated during a worst-case performance test, can be a satisfactory mechanism for insuring long-term compliance with the proposed MACT emission standards. This method is well established and understood and has been in practice for many years. While EPA may have a preference for CEMS, it has not shown that the use of operational/feedrate parameter controls is inadequate, and should not prohibit their use in favor of the more expensive unproven CEMS. The general intent of the operational/feedrate parameter option is to insure that hazardous waste combustors are maintained within the operating envelope in which it has been demonstrated that the emission standards can be met. That envelope is established during a worst-case trial burn. Subsequent operation of the combustion unit is usually at conditions that are less severe than those of the trial burn. Given the wide scope of operating and feedrate parameters that a facility must adhere to, Eastman believes that the Agency and public can have high assurance that combustion units operated within the range of conditions demonstrated during the trial burn pose no significant threat to human health and the environment. EPA claims that the "public" does not trust this method of compliance. Eastman has found little or no resistance or objection to this approach from the communities surrounding their facilities. EPA should not abandon this reliable proven compliance option, particularly in light of the early stage of development and uncertainties surrounding mercury and particulate matter CEMS.

CEM2.050(182)(a) f. Dow believes EPA is premature in requiring certain Continuous Emissions Monitors (CEMs) since a number of these technologies have not been validated and are nowhere near being commercially available.

CEM2.050(182)(b) E. <u>CEM Issues</u> Based on work contracted by CRWI, CMA and CKRC, CEM technology is not sufficiently developed so that it can be used to replace current control and monitoring approaches. EPA needs to revise its regulations to more clearly provide for this reality.

There remains much technology development work to be done on CEMs for the variety of pollutants and combustion technologies in use today. While some CEMs systems are in use in particular applications for particular emissions, there are many situations where such CEMs will not work. EPA's proposed regulations should be revised to address this. Dow has worked on this issue in conjunction with CRWI, CMA and CKRC and incorporates the comments made there which are applicable to HWIs.

CEM2.050(182)(c) Dow however does not believe that mercury and PM CEMs are sufficiently developed to be deemed commercially available nor meet the EPA proposed specifications. These devices, while they may be available in the future, are likely not to be available for use when compliance with the rule will take effect. To address this, EPA must revise its proposed approach to provide for alternate compliance approaches, such as are in use today, and to provide true incentives to encourage the development of such CEM technologies which are ultimately deemed necessary to monitor stack emissions.

CEM2.051(183)(a) Continuous Emission Monitors 3M supports the use of continuous emission monitors (CEM) where the technology is reliable and cost-effective. However, 3M does not feel that mercury and PM emission CEMs are sufficiently reliable at this time to require their use.

CEM2.051(183)(b) 3M recommends that the rule provide for optional use of PM, Hg and other metals of concern, CEMs along with a method that gives incentives to install and maintain CEMs. This needs to include reduced waste feed analysis.

CEM2.051(183)(c) 3M supports the use of emission monitoring to assure compliance, However 3M believes that the current state of development of monitoring instrumentation for PM and mercury has not reached the level of reliability necessary for the EPA to mandate the use of CEMs. The optional use of CEMs with trade-offs on other compliance procedures (e.g., feed restriction, compliance testing) is desirable as has been suggested in the proposed MACT Rule.

CEM2.051(183)(d) In addition, PM and Hg CEMs have no record for reliability under USEPA regulations. In addition, operation of PM and Hg CEMs do not impact the amount of emissions from the stack. The factors that control emissions of these two parameters are feed rates and APC control parameters. For example, LDR limitations prohibit incineration of waste containing even insignificant quantities of mercury in most hazardous waste combustors. 3M has a complete prohibition on incineration of Hg containing wastes.

As described in detail in comments submitted by CRWI, three major industry trade groups, CRWI, CMA and CKRC contracted with ENSR to perform a detailed study of the user experience with Hg and PM CEMs that could justify a requirement to use these analyzers. Clearly the result of this study show that these CEMs are not sufficiently reliable at this time to be required for use under this proposed rule.

3M encourages EPA to continue with demonstration projects such as are on-going at the Holly Hill, SC, cement kiln and the Wilmington, DE, incinerator. However, considering the results of the ENSR assessment of the current state of PM and Hg monitors, EPA should not mandate their use. Instead, 3M recommends that the use of PM, Hg, and other metal CEMs be optional in lieu of frequent waste analysis.

CEM2.055(205)(a) In addition, these units have been used in many facilities for many years and are considered to be reliable. However, our member sites have little or no proven experience with PM or Hg CEMS. TCC is very concerned that our sites have no previous experience with these unusual monitoring systems in this unique application. Further, as noted under scheduling, there will be insufficient time to specify, order, install, and test before full compliance is expected! TCC requests that the EPA consider further full-scale field testing of all the requested CEMs to insure that the proposed requirements are feasible.

CEM2.057 c. <u>Lafarge supports the requirement of continuous emission monitors for total mercury and particulate matter</u> Lafarge believes that the MACT implementation of viable continuous emission monitors (61 FR 17379, 40 CFR 63.1210 (a)) represents compliance policy based on good science. The use of CEMS also represents a more accurate measure of actual emissions than the implementation of limits on operating and feedrate parameters.

CEM3.001(094) 5. Continuous Monitoring. National Cement objects to EPA's proposal to require CEMs for PK HCl $C1_2$, LVM, SVM, and Hg because there has been insufficient research and testing to show that CEMs can be used to demonstrate compliance with these MACT standards. With respect to PM CEMS, EPA has not provided any information regarding vendors, cost, accuracy, reliability, or other specifications. Until PM CEMs have been satisfactorily tested in the United States, their use should not be mandated. Similarly, EPA has provided little or no technical information regarding HCl $C1_2$. LVM, SVM, and Hg CEMS, these instruments remain completely unproven in the United States, and their use should not be required. In the cases where EPA currently has made use of CEMs optional, National objects to EPA's proposals to mandate, without further notice and comment use of CEMs if EPA should, in the future, determine that such use is feasible. Prior to promulgating a rule that requires use of new and novel technology, EPA should give notice that provides detailed technical specifications and testing results for the technology and thereby allow regulated facilities to fully assess the proposed technology and provide comment.

CEM3.002(101)(a) Many of the CEMs discussed in the proposed rule are not available at this time, are not proven reliable and capable of providing data on an ongoing basis for extended period of times, or may be unsuitable to a particular facility's operating environment;

CEM3.002(101)(c) However, many of the CEMs discussed in the proposed rule are not available at this time, are not proven reliable and capable of providing data on an ongoing basis for extended period of times, or may be unsuitable to a particular facility's operating environment. Examples of problematic or undeveloped CEMs include those for mercury, metals, HCl and PM. Until these CEMs are perfected, the feedstream and operating limits are reliable controls if these are properly correlated with stack emissions performance testing and trial bums.

CEM3.003(105) However, many of the CEMs (metals, mercury) discussed in the proposed rule are not commercially available at this time, or are not reliable and capable of providing data on an ongoing basis for extended periods of time. Until these CEMs are perfected, the feedstream and operating limits are reliable controls if these are property correlated with stack emission performance tests and trial burns.

CEM3.005(106)(a) EPA should not require use of MM or Hg CEMS.

CEM3.008(117)(a) Under the revised rule, EPA proposes the use of additional continuous emissions monitors (CEMS) to quantify mercury, particulate matter, semivolatile metals, low volatility metals, hydrogen chloride, and chlorine in HWC stack gas. We believe that the additional CEMS, which in some cases consist of unproven technology, are unnecessary and place a significant operational and economic burden on HWC operators.

CEM3.008(117)(b) 8. ISSUE: Compliance Monitoring Requirements. Rule Cite: CEMS for CO, O_2, and uncombusted hydrocarbons (HC) that are currently required for incinerators will be supplemented with similar requirements for mercury (Hg) and particulate matter CEMS. Additionally, EPA encourages monitoring for semi-volatile and low-volatility metals (SVM and LVM) as well as HCl/Cl_2. (Proposed Rule, 61 FR 17419, Part Five, Paragraph II.C.)

Comment: DoD installations will be conducting extensive RCRA trial burn testing of incineration systems in order to characterize stack emissions in great detail. Data which is collected during these trial burns will be used to identify the operating parameters under which these facilities will meed the proposed MACT standards. Continuous monitoring for Hg, SVMs, LVMs, and HCl/Cl_2 would be redundant and excessive to implement for DoD facilities, most of which have a short, finite operating life (the expected operating life of a DoD HWC facility is from two to five years). CEMS for these species are not well established in terms of technical standards, reliability, ease of use, maintenance, and overall reliability/accuracy. DoD believes that uncertainties that EPA has regarding the effectiveness of CEMS technology to Hg and organic products of incomplete combustion (PICS) should be resolved by data collection during well designed trial burns, not by requirements for complex, inefficient, and potentially unfeasible research-type continuous monitoring stipulations.

Recommendation: EPA eliminate the heed for certain CEMS (SVM, LVM, Hg, HC and HCl/Cl_2) by allowing the use of detailed trial burn data in order to establish operating conditions at which incinerators will meet MACT. (e.g. afterburner temperature residence time, and pressure drops that allowed the incinerator to meet MACT during trial burns.)

CEM3.011(126) 3.4 EPA Should Require Use of Continuous Emissions Monitoring Systems for Semi- volatile Metals, Low Volatile Metals, HCl and Molecular Chlorine if these CEMS Technologies are Commercially and Technically Available

EPA should make a determination one way or the other on the commercial and technical availability of CEMS technology of SVM, LVM, HCl and total chlorine on the record, and publish its finding. If these technologies are presently available on a worldwide basis, then their use should be required by the proposed rule. If EPA publishes a finding that such technologies are available in the future, the proposed rule should be amended to require the use of such CEMS technologies within 3 years of such an EPA notice.

CEM3.013(129)(b) CEMs for multimetals (SVM and LVM) and HCl/chlorine are optional. Since multimetal CEMs are several years from commercial development, the proposed. rule allows for the use of either a multimetals CEM or feedrate restrictions for SVM and LVM. If multimetal CEM is not available, facilities will be required to restrict chlorine feed rates to minimize the formation of metal chlorate salts. If a facility already has chlorine restrictions, there is very little incentive to use a HCl/chlorine CEM at this time.

CEM3.013(129)(c) Since multimetal CEMs are not commercially available (several are currently being developed), the rule does not require CEMs for SVM and LVM but does require feed rate restrictions for the metals as well as for chlorine. The logic is that many metals form chlorate salts and become more difficult to capture with existing air pollution control devices. Given that chlorine restrictions will be part of operating permits until multimetal CEMs are available, it does not make operational sense to have both feed rate restriction and HCl/chlorine CEMs on a stack.

CEM3.019(152) In addition, EPA is proposing undemonstrated and unproven CEMs for PM and also CEMS for multi-metals which are not even available. We strongly object to EPA's proposing requirements with which sources can neither comply nor on which they may adequately comment due to either the nonexistence or unproven nature of the technology.

CEM3.028(205)(a) TCC requests that the EPA consider further full-scale field testing of all the requested CEMs to insure that the proposed requirements are feasible.

CEM3.031(212) CEMs are in varying degrees of commercialization. Lafarge believes in their appropriate use in assisting process operations. However a CEM that is relied upon to oversee and deliver an EPA enforcement initiative is inappropriate, particularly when compliance limits are set on the historical basis of average annual limits.

CEM4.003(094) 5. Continuous Monitoring. National Cement objects to EPA's proposal to require CEMs for PK HCl, $C1_2$, LVM, SVM, and Hg because there has been insufficient research and testing to show that CEMs can be used to demonstrate compliance with these MACT standards. With respect to PM CEMS, EPA has not provided any information regarding vendors, cost, accuracy, reliability, or other specifications. Until PM CEMs have been satisfactorily tested in the United States, their use should not be mandated. Similarly, EPA has provided little or no technical information regarding HCl $C1_2$. LVM, SVM, and Hg CEMS, these instruments remain completely unproven in the United States, and their use should not be required. In the cases where EPA currently has made use of CEMs optional, National objects to EPA's proposals to mandate, without further notice and comment use of CEMs if EPA should, in the future, determine that such use is feasible. Prior to promulgating a rule that requires use of new and novel technology, EPA should give notice that provides detailed technical specifications and testing results for the technology and thereby allow regulated facilities to fully assess the proposed technology and provide comment.

CEM4.007(117)(a) Under the revised rule, EPA proposes the use of additional continuous emissions monitors (CEMS) to quantify mercury, particulate matter, semivolatile metals, low volatility metals, hydrogen chloride, and chlorine in HWC stack gas. We believe that the additional CEMS, which in some cases consist of unproven technology, are unnecessary and place a significant operational and economic burden on HWC operators.

CEM4.007(117)(b) 8. ISSUE: Compliance Monitoring Requirements. Rule Cite: CEMS for CO, O_2, and uncombusted hydrocarbons (HC) that are currently required for incinerators will be supplemented with similar requirements for mercury (Hg) and particulate matter CEMS. Additionally, EPA encourages monitoring for semi-volatile and low-volatility metals (SVM and LVM) as well as HCl/Cl_2. (Proposed Rule, 61 FR 17419, Part Five, Paragraph II.C.)

Comment: DoD installations will be conducting extensive RCRA trial burn testing of incineration systems in order to characterize stack emissions in great detail. Data which is collected during these trial burns will be used to identify the operating parameters under which these facilities will meet the proposed MACT standards. Continuous monitoring for Hg, SVMs, LVMs, and HCl/Cl_2 would be redundant and excessive to implement for DoD facilities, most of which have a short, finite operating life (the expected operating life of a DoD HWC facility is from two to five years). CEMS for these species are tot well established in terms of technical standards, reliability, ease of use, maintenance, and overall reliability/accuracy. DoD believes that uncertainties that EPA has regarding the effectiveness of CEMS technology to Hg and organic products of incomplete combustion (PICS) should be resolved by data collection during well designed trial burns, not by requirements for complex, inefficient, and potentially unfeasible research-type continuous monitoring stipulations.

Recommendation: EPA eliminate the heed for certain CEMS (SVM, LVM, Hg, HC and HCl/Cl_2) by allowing the use of detailed trial burn data in order to establish operating conditions at which incinerators will meet MACT. (e.g. afterburner temperature residence time, and pressure drops that allowed the incinerator to meet MACT during trial burns.)

CEM4.008(124)(a) 5.II.C.4.c. Option 2: Use of Limits on Operating Parameters to Document Compliance If a source elects not to use a MM CEMS or a CEMS is not available, the proposed rule would require a site-specific PM limit and comply with limits on metals feedrate, chlorine feedrate, and maximum temperature at the inlet to the PM control device (61 FR 17430-17431).

CEM4.010(126) 3.4 EPA Should Require Use of Continuous Emissions Monitoring Systems for Semi-volatile Metals, Low Volatile Metals, HCl and Molecular Chlorine if these CEMS Technologies are Commercially and Technically Available

EPA should make a determination one way or the other on the commercial and technical availability of CEMS technology of SVM, LVM, HCl and total chlorine on the record, and publish its finding. If these technologies are presently available on a worldwide basis, then their use should be required by the proposed rule. If EPA publishes a finding that such technologies are available in the future, the proposed rule should be amended to require the use of such CEMS technologies within 3 years of such an EPA notice.

CEM4.011(129)(b) It is suggested that the final rule not require Hg, PM, HCl/chlorine, SVM or LVM CEMs to demonstrate compliance with the rule.

CEM4.020(170) D. The Proposed Requirements For Compliance Monitoring Systems (CMS) And Continuous Emissions Monitoring (CEMs) Certifications Are Problematic

Compliance Monitoring Systems

The HWC MACT proposal significantly alters the compliance monitoring systems from what facilities currently use for compliance under the BIF rule (Attachment 8). Among the most significant changes is the proposed mandated use of CEMS for emissions not previously monitored on a continuous basis, including PM, Hg, Cl_2, and HCl. (61 FR 17417-17444)

CKRC is supportive of using compliance monitoring systems to keep the public apprized of facility operations, better educated regarding actual emissions, and fully informed that the facility is operating in a manner protective of human health and the environment. However, the proposal's compliance monitoring scheme is greatly dependent on yet-to-be-developed CEMS, conflicting and/or inappropriate standard-setting requirements, and inadequate compliance methods. [Footnote 193: Specific details of these compliance system difficulties are described in other sections of these comments.]

Thus, CKRC is opposed to this significant change in the CMS due to the fact that none of the proposed CEMS has demonstrated a capability to operate effectively on a cement kiln in accordance with the operating conditions EPA has proposed. They have not even passed the required Method 301 validation testing protocol as equivalent methods. Hence, any limitation set for CEMS monitoring is inappropriate. If the reference method and CEMS measure different constituents, then developing a limit using the reference method database is totally wrong and unenforceable. Further, the proposal calls for different and additional averaging periods for the continuous monitoring requirements. Multiple limits are inappropriate unless they are set with full appreciation, understanding and treatment of the effect multiple restrictions have on the likelihood of compliance with data-derived (statistically set) emissions limits. Therefore, it is likely that the compliance monitoring system as proposed will be subject to many errors, limited accuracy, and significant "downtime."

CKRC is concerned that these unavoidable occurrences will inhibit the proposal's intentions to better assure the public about a facility's protectiveness and actually result in decreased public trust in the safety of our facilities' operations. CKRC believes it is more practical to implement fewer, more reliable and proven compliance monitoring mechanisms at a facility rather than require every potential mechanism on a facility -- regardless of the stage of development or the impact on other systems. As discussed in other sections of these comments, EPA can encourage the development and installation of alternative compliance measures such as CEMS by providing impacted facilities with adequate incentives including cost savings or testing and operating limit trade-offs. The quality of information received from the proven and appropriate mechanisms is more valuable in assuring the public that a facility is in compliance with protective standards than is t he appearance of a massive, and complicated, compliance monitoring system that provides either skewed or meaningless data and information.

CEMs Certifications

While CKRC is aware of ongoing Agency activities in an attempt to validate CEMs technologies, we provide the following preliminary comments:

Under the BIF rule, CEMs are required for oxygen, carbon monoxide, and total hydrocarbons (40 CFR 266, Subpart H). The proposed addition of requirements for continuous emissions monitors on particulates, metals, mercury, hydrogen chloride, and chlorine (61 FR 17417-17444) presents numerous technical and compliance difficulties as many of them are not yet commercially available and/or have not been proven to work effectively on a cement kiln device. [Footnote 194: Detailed discussion of these difficulties is provided in other sections of these comments.] However, in addition to these fundamental technical problems, the certification of these CEMs presents numerous implementation difficulties.

CKRC is supportive of the concept of using continuous emissions monitoring as a compliance and performance assurance tool when appropriate, but is very concerned that the current state of development of the monitoring instrumentation has not reached the level of accuracy and reliability [Footnote 195: In conjunction with CMA and CRWI, CKRC contracted ENSR to perform "An Evaluation of the State-of-the-Art of Mercury and Particulate CEMs Required by the Proposed MACT Rule." We were unable to complete the final report by this comment deadline, but will transmit the final version under separate cover soon after the August 19, 1996 deadline.] necessary for EPA to mandate the implementation of these CEMs at cement kiln facilities. Instead, CKRC urges the Agency to modify the proposal and take a more practical approach. EPA's proposal should provide facilities with the option of using CEMs as an alternative to other required compliance procedures. Howe ver, in order to make this a workable alternative, EPA must ensure that the options provide interested facilities with real incentives (i.e., cost effectiveness, reduced testing) which currently are absent from the proposal.

CEM4.024(175)(a) CONTINUOUS EMISSION MONITORING REQUIREMENTS The reliability of CEMs for such pollutants as mercury, particulates, and HCl have not been demonstrated within the industry.

CEM4.024(175)(c) With similar requirements for CEMs for mercury and particulates, downtime for incineration systems would substantially increase. Companies would have to install duplicate systems to be able to maintain any acceptable reliability for their operations.

The need for CEMs for mercury, particulates, and HCl is also in question since emissions of these parameters would be required to be tested during stack testing. Such testing would be performed during incineration of waste representative of routine operations. In the event that the waste streams changed or in the event of a modification to the incinerator or air pollution control systems, such stack testing would be required to ensure that such changes do not result in an increase in emissions above an acceptable level.

In addition, operating parameters are established during trial burns to ensure that systems do not degrade over time that would otherwise result in an emission increase. As a result of the factors, Glaxo Wellcome Inc. recommends that CEM requirements for mercury, particulates, and HCl be removed from this proposal.

CEM4.025(182)(a) E. CEM Issues Based on work contracted by CRWI, CMA and CKRC, CEM technology is not sufficiently developed so that it can be used to replace current control and monitoring approaches. EPA needs to revise its regulations to more clearly provide for this reality.

There remains much technology development work to be done on CEMs for the variety of pollutants and combustion technologies in use today. While some CEMs systems are in use in particular applications for particular emissions, there are many situations where such CEMs will not work. EPA's proposed regulations should be revised to address this. Dow has worked on this issue in conjunction with CRWI, CMA and CKRC and incorporates the comments made there which are applicable to HWIs.

CEM4.030(205)(a) TCC requests that the EPA consider further full-scale field testing of all the requested CEMs to insure that the proposed requirements are feasible.

CEM6.003(139) Furthermore, EPA through its own demonstration program, is unable to demonstrate that the monitoring technology proposed in this rule can be successfully tested for relative accuracy (RA). 40 CFR 60 Appendix F requires that an instrument subject to relative accuracy testing requirements be able to demonstrate 20 percent Relative Accuracy. The relative accuracy calculated in the test demonstration for HC and Hg continuous monitoring were as high as 1500%. FMC and FCC object to the development of monitoring regulations when the monitoring technology can not be demonstrated to pass Relative Accuracy (RA) testing procedures.

EPA has not demonstrated that the manual methods used to do relative accuracy tests can be performed with repeatable and accurate results. Furthermore, EPA is proposing to Relative Accuracy Test Audit monitors that provide continuous real time measurements using manual methods that provide time integrated values. EPA Methods 5, 25 and 29 have not been demonstrated to meet accuracy, repeatability and consistency of time averaging requirements basic to any monitoring program. FMC and FCC object to continuous emission monitoring for PM, Hg and HC on this basis.

CEM1.NOD.001(147)(a) Another indication of EPA's actions apparently inconsistent with actual risks imposed deals with the use of continuous emissions monitors ("CEMs"). In Continental's judgment, requirements for CEMs are (1) unproven, in legal contravention of the achievability requirement within the MACT program;

CEM1.NOD.003(222) 3. CEMs should not be mandated, but incentives should be added to encourage their use.

CEM2.NOD.010(233) 4. The Department will also encounter significant additional costs that far exceed the costs typically incurred by incinerators that burn solely hazardous waste when complying with test burn and compliance monitoring requirements. For example, testing equipment once used will be radioactively contaminated and have to be replaced or handled as contaminated material.

Some CEMS (e.g., Hg, multi-metals), whose performance in a radionuclide environment is questionable (at best) or unknown, may require slight modifications (e.g., replace a faulty probe, or sensing surface) by the manufacturer or manufacturer's representative. Equipment manufacturers and their representatives are not equipped to deal with radioactively contaminated monitoring equipment. Most likely, DOE will end up purchasing replacements for radioactivity contaminated equipment, unless the equipment can be decontaminated to remove the radioactive contamination.

CS3A-002 (5) The Illinois Environmental Protection Agency appreciates this opportunity to comment on your proposal to develop testing requirements and methodologies for continuous emissions monitoring systems (CEMS) for particulate matter and mercury at hazardous waste combustors. We agree that, particulate matter and mercury are parameters of concern. There is a need for the U.S. Environmental Protection Agency (USEPA) to identify formal testing requirements, and it is appropriate that USEPA establish and designate the acceptable methodologies for testing for emissions of particulate matter and mercury.

RSCP-143 (1) Requirement to Use CEMS The proposed HWC regulation requires the use of CEMS for particulate, mercury, HCl & Cl_2, and multimetals operational parameters. A PM CEMS is to be used to establish a compliance parameter for D/F, SVK and LVM emission standards. Such a requirement does not appear to be the intent of the Clean Air Act. In examining the outline of Section 7412, Hazardous Air Pollutants, we find the following:

- (a) Definitions
- (b) List of Pollutants
    - (1) Initial list
    - (2) Revision of list
    - (3) Petitions to modify list
    - (4) Further information
    - (5) Test methods
    - (6) Prevention of significant deterioration
    - (7) Lead
- (c) List of sources
    - (1) General
    - (2) Requirement for emission standards
    - (3) Area sources
    - (4) Previously regulated categories
    - (5) Additional categories
    - (6) Specific pollutants (with reference to d(2) & d(4)
    - (7) Research facilities
    - (8) Boat manufacturing
- (d) Emissions Standards
    - (1) General
    - (2) Standards and methods
    - (3) New and existing sources
    - (4) Health threshold

Looking at the CAA from the viewpoint of a person tasked with executing the desires of Congress, it would appear that (a) defines the main terms, (b) fists the pollutants of concern and changes to that list (c) shows which sources are affected, and (d) shows what the sources must do to comply, and so on.

The rest of the Act follows through with a similar format. Section (e) is the schedule for standards and review. Section (f) is the standard to protect health and environment, which notably includes a specific reference to include "...negative health or environmental consequences to the community of efforts to reduce such risks." Section (g) addresses modifications. The rest continues in this same vein.

However, Section (b) is entitled "List of Pollutants" and each sub-paragraph is clearly related to the HAP list and revisions to the list. Sub-paragraph (b)(5) entitled "Test Methods", reads as follows: "The Administrator may establish, by rule, test measures and other analytic procedures for monitoring and measuring emissions, ambient concentrations, deposition, and bioaccumulation of hazardous air pollutants." Section (c) lists certain specific categories or pollutants to be addressed. Sub-paragraph (c)(6) addresses specific pollutants that affect cement kilns and other HWCs and also specifically references sub-paragraphs (d)(2) and (d)(4). Sub-paragraph (d)(2) deals with the implementation of the standards and methods to achieve those standards.

Nowhere in this section, paragraphs, or sub-paragraphs are continuous emissions monitors mentioned. There are specific references to a number of generic methods for reducing or eliminating emissions. It would however, be a long stretch to take words from (b)(5) and link them to (d)(2) requirements to establish the most expensive and difficult compliance approach: continuous emission monitors, especially when monitoring cannot control or when other control methods may be better suited to any specific application. It is an even longer stretch considering these monitors don't yet exist.

RCSP-144 (1) (a) B. PM CEMS should not be required because they are not necessary and have not been demonstrated to be reliable. PM monitors have been used more than Hg monitors, but they have not been shown to be reliable under all conditions they must operate. In fact, EPA has just begun limited demonstration tests for PM CEMS.

Comment Summary for Issue 1

Nearly all the commenters suggest that PM, Hg, MM, HCl, and Cl_2 CEMS are not available or demonstrated, expensive, unreliable, or unnecessary and should not be required in the time frame of this rule or ever. There was some opposing opinion as well as good reasons why a facility might choose to use CEMS in lieu of operating parameters established during a performance test.

Other subissues include:

- CO, HC, and O_2 CEMS are demonstrated;
- Field studies against manual stack methods should be performed before a CEMS is required;
- CEMS certifications and the incorporation of “uncertainty” into the compliance limit;

- EPA lacks the legal authority to require CEMS;
- EPA testing of the CEMS showed durability problems;
- CEMS accuracy has not been tested against the reference methods;
- Organic CEMS not available or demonstrated, expensive, or unnecessary;
- Use of CEMS in coordination with AWFCOs may cause operational problems, increase facility downtime;
- Requiring CEMS is BTF;
- The need for CEMS and AWFCO waivers in certain situations if CEMS are required;
- Facilities need incentives if CEMS are required;
- There is no risk justification for requiring these CEMS; and
- CEMS will be contaminated with radionuclides at DOE facilities.

Response to Issue 1

EPA proposed requiring PM and Hg CEMS, but gave facilities the flexibility to use MM, HCl, and Cl_2 CEMS as they desire. Since proposal, EPA has undergone field studies of PM and Hg CEMS to demonstrate their viability as a compliance device. The PM and Hg CEMS Demonstration Test Reports are documented and summarized in the Technical Support Document Volume IV. In summary, EPA believes PM CEMS have been adequately demonstrated to require them at HWC sources. EPA believes Hg, MM, HCl, and Cl_2 CEMS have not been demonstrated. Readers should consult the first issue of each section of this response to comments volume dealing with PM, Hg, MM, and HCl and Cl_2 CEMS for responses specific to comments related specifically to each CEMS.

EPA agrees that CO, HC, and O_2 CEMS are demonstrated and should be required when a relevant standard applies.

EPA agrees that stack testing of CEMS against manual methods should be done in most cases, but believes cylinder gases provide a better, more cost effective alternative to manual stack testing for all CEMS that measure gases.

The issue of whether EPA should certify CEMS is discussed in section 11 of this volume. The issue of whether "uncertainty" should be incorporated into the CEMS compliance level is discussed in issue number 4 of this section ("incentives").

EPA believes it has the legal authority to define and describe the compliance methodology to ensure compliance with standards, including the authority to require CEMS.

EPA agrees that in its early tests, problems with CEMS were observed. These problems were noted in comment CEM1.089. EPA agrees with these observations, but notes that the purpose of these early tests were to understand whether further tests were necessary. In most cases, these problems were easily corrected or themselves were tests to see if the issue was relevant. EPA pursued corrections to its approach as necessary in the later tests.

EPA did perform reference method tests in its early CEMS tests. But again, EPA did not use these tests to gage the accuracy of the CEMS, but rather did so only to see if further testing was justified. Hence the shortcomings noted by the commenter.

EPA agrees that CEMS which measure individual organic compounds are not yet available, sufficiently demonstrated, or cost effective enough for EPA to require them in this rulemaking.

EPA recognizes that CEMS are new to facilities, and like most new equipment might have more downtime while a facility learns to use and maintain the CEMS. Nonetheless, EPA does believe an emissions exceedance must be followed by an immediate cut off of hazardous waste fed to the unit.

EPA does not believe compliance is a beyond-the-floor control.

EPA believes AWFCO waivers for CEMS are appropriate in some cases, but the commenters lacked enough specificity in their comments for EPA to act on any specific recommendations.

EPA does not understand why a facility needs incentives to use equipment that is required. Incentives for the using CEMS that are not required are discussed in issue 4 of this section.

EPA believes risk (in the technical sense of risk assessment) is not a factor in deciding what compliance methodology to choose. EPA does believe, however, that HAPs that pose a relatively greater threat or health hazard, in the general sense, require better monitoring to ensure compliance.

Finally, EPA concurs that equipment used at mixed waste facilities, such as those operated by DOE, may become contaminated with radionuclides. Note also EPA's general confusion regarding DOE's comments in section 1.9 of this volume of the Response to Comments document.

2. <u>CEMS in Other Countries</u>

<u>Comment</u>

CEM1.001(071)(b) Also while many of these CEMs are in operation in Europe the regulatory groups do not mandate the same stream time and degree of QA/QC required by USEPA and we are all aware of the heavy-handed methods used when our systems do not operate to the letter of the law.

CEM1.030(127)(b) For each of these incinerators [operated in Switzerland], the following pertinent emissions monitoring requirements apply.

- The measured values are to be averaged over a period of one hour.
- For continuously measured emissions, compliance with the limits is taken to be maintained if,

within a calendar year: a) none of the daily averages exceed the emission limit, b) 97% of all hourly averages do not exceed 1.2 times the emission limit, and c) none of the hourly averages exceed twice the emission limit.

CEM1.054(147)(b) As stated in CKRC's comments to the April 19th proposal (Section XII.k), facilities burning hazardous waste in Europe are subject to both the provisions of Council Directive 94/67/EC (16 December 1994) and specific national standards implementing this directive. The monitoring requirements outlined in the Directive and the German regulation (17 BimSchV) [Footnote 1: Bundesrat, 1990. Seventeenth Ordinance on the Implementation of the Federal Emmission Control Act (Ordinance on Incinerators for Waste and similar Combustible Materials). Bonn, Germany.] specify both operating conditions and emission limitations. The Application of numeric values to determine acceptable performance in the Directive recognizes variations in the emissions occur and defines acceptable values for 30 minutes and 24 hours periods for continuously monitored parameters such as total dust (particulates), THC, HCl, and SO_2. A similar application occurs in the German Ordinance and NO_x is added to the list of CEM monitored parameters. Both regulations also place limits on carbon monoxide and while the same numeric values are used, the averaging time is shorter. Operating condition indicators — oxygen and temperature — are also monitored, but specified regulatory values do not have to be maintained if it can be demonstrated during operation that the emissions from the facility do not increase when it is operated under alternate conditions.

CEM1.065(170) APPENDIX K CONTINUOUS EMISSIONS MONITORING ISSUES AND EU COMPARISONS EU HWI Monitoring Requirement. In the preamble of the proposed rule, the Agency identifies the EU experience with technologies such as continuous monitoring devices as goals for adoption within the US system. CKRC believes the Agency has overstated the transferability of these technologies. Further, the Agency has not fully disclosed the significant operational and implementation differences between these regulatory two systems.

Facilities burning hazardous waste in Europe are subject to both the provisions of Council Directive 94/67/EC (16 December 1994) and specific national standards implementing this directive, such as, the monitoring requirements outlined in German regulation (17. BImSchV)1 specify both operating conditions and emission limitations. Copies of these two regulations are attached to these comments.

The numeric standards that determine acceptable performance in the Directive recognizes variations in the emissions occur and defines significantly different acceptable values for 30 minute and 24 hour periods for continuously monitored parameters such as total dust (particulates), THC, HCl, and SO_2. A similar implementation occurs in the German Ordinance where NO_x is added to the list of CEM monitored parameters. Both regulations also place limits on carbon monoxide and while the same numeric values are used, the averaging time is shorter than for the other parameters. Operating condition indicators — oxygen and temperature — are also monitored, but specified regulatory values do not have to be maintained once a facility demonstrates that its emissions do not increase when it is operated under more appropriate conditions.

The technology used for the continuous measurements is, for the most part, the some as the ones used in North America. CO, THC, SO_2 and NO_x monitors are common on many combustion and process sources. Less common are HCl monitors. Few, if any, PM monitors are installed; however, opacity monitors are routinely used. Aside from the issues of double counting with the proposed averaging methods and time spans of the proposed rule, several significant concerns arise from the proposed implementation of continuous HCl and PM monitors.

CEM1.071(181) Also included in these sections were comparisons of the German regulations with the EPA regulations. One very noteworthy German regulation was the inclusion of the CEMS calibration uncertainty in determining the compliance status of the source. The maximum allowable measured value is the emission limit plus the uncertainty of the calibration relation. The German regulations recognize the limitations of the CEMS and do no impose an absolute limit as does the EPA.

CS3A-010 (1)(d) In the European Union[FN6], this is not a problem because emissions test results are more for advisory than for compliance purposes. In the United States, however, the potential for $25,000 per day per occurrence fine and other penalties for willful misconduct provisions of the Clean Air Act give an entirely different meaning to the calibration and recertification standards. It is crucial that calibration and certification standards be able to provide reasonable assurance that CEMS that meet those standards are likely to produce accurate results, accurate in the context of US CAA, not in the EU advisory context. [FN6] See Appendix K, "Continuous Emissions Monitoring Issues and EU Comparisons," of CKRC's August 1996 Comments on EPA's HWC MACT rule.

RSCP-129 (1) As stated in Chapter 2, Volume IV of EPA's Technical Support Documents to the MACT Rule: "The German approach to the use of CEMS for compliance monitoring is based on the application of practical engineering philosophy. CEMS are employed, despite the known sensitivities to various factors such as particle composition and size distribution, within the statistical limitations determined by a site specific calibration procedure that defines the statistical relationship between CEMS response and PM loading. The reliability of the CEMS and the statistical relationships are assured as best as possible through performance based CEMS specifications and suitability testing and other long term tests run on plants at normal operating conditions using both CEMS and manual methods. This allows the development of confidence in the utility of the CEMS."

Table 2-4 of the above referenced document compares German regulation for PM CEMs with the proposed EPA regulation. This comparison shows the more stringent approach by EPA has not incorporated the concept of data availability (none by EPA vs. > 90% by the Germans). Comparison of the EPA proposed QA also illustrates the proposed requirement by EPA for more frequent instrument response checks (Absolute Calibration Audits) (Quarterly vs. yearly) and calibration checks (Relative Calibration Audits) (Every 18 months vs. 5 years).

Similar review of the Preamble to the MACT Rule Part Five, 11, C. 7. indicates a willingness by EPA to accept much of the German approach to using CEMS. However, EPA's approach does not apply some of the key factors that are part of the German's "application of a practical engineering philosophy" including:

- TUV equivalent certification (laboratory plus onsite "trial period" for suitability testing)
- Establishment of a combustion unit specific maintenance interval
- Data availability > 90%
- A more reasonable frequency of calibration (3 - 5 years)

- A more reasonable measure of valid data (minimum of 20 minutes per half hour averaging period)
- Development of an uncertainty factor during calibration which is used to determine the actual measured site specific value which is an exceedance of the standard (emission limit plus uncertainty)

Workable Solution

Apply more of the "German Approach". Base the frequency of collection on the pollutant-specific needs. The need for short-term (e.g., 15 second) CO response may be far more valuable in the control of process emissions than short-term particulate or metals emissions information. Incorporate the concept of data availability for all CEMS. Allow the use of process parameter monitoring to measure compliance assurance when the CEMs is not operational (e.g., air pollution control [APC] parameters when CEM for particulate is off-specification).

RCSP-170 (1) The EU standard for particulate CEMS states that the 95 percent statistical interval for the calibration is subtracted from the monitored result before comparing to the standard. The largest acceptable interval is 30 percent [2]. Since the confidence limit only applies to the location of the calibration line, it does not describe the interval in which actual measurements are likely to reside -- the tolerance interval is used instead. For the same 95% statistical confidence level, 95% of the particulate CEMS results should be within 140 percent of the calibrated standard. In effect, the compliance limit has to be increased to 240 percent of the stated level to avoid an excess probability of finding violations when the facility is operating exactly as it was during the calibration due to data noise alone.

[Footnote 2: Council Directive 94/67/EC of 19 December 1994 on the incineration of hazardous waste, Official Journal of the European Communities, L 365/34, December 31, 1994, Annex III, paragraph 4. "the values of the 95% confidence intervals determined at the emission limit values shall not exceed the following percentages of the emission limit values: PM -- 30%"]

The Performance Specification for PM monitors requires these units will be calibrated over a range of "a normal minimum level to twice the emission limit" [3]. Since the method quantitation level [MQL] for a 2-hour (3.5 dsm3 sample volume) Method 5 test is in the range of 0.003 gr/dscf @ 7% O_2, and the normal operating condition for many cement kilns is near or below the MQL, so minimum 4-hour runs will need.

[Footnote 3: Volume IV Technical Support Document to HWR, page A-6]

<u>Comment Summary</u>

Commenters relayed the differences in how CEMS are applied in other countries. Commenters specifically suggest that

- Enforcement is significantly more stringent in the US than elsewhere;

- Averaging periods are different and more than one averaging period may apply;

- Opacity monitors are used in Germany, not PM CEMS; and
- Germany adds "uncertainty" to the limit a facility needs to comply with.

Response

In the proposed rule, EPA cited many examples of how CEMS are used in Europe, but not here in the US. For instance, we cited the use of PM CEMS in Germany (p. 17436) and a Cl_2 CEMS marketed by a European firm (p. 17433). EPA believed that if these CEMS are used overseas, they could be used in the US as well.

EPA agrees that every country enforces their laws differently and some countries may be less stringent in enforcing their standards than the US. However, EPA does not believe this is typically the case. While fundamental differences in the approach to law require different approaches to enforcement from country-to-country, the differences are not so significant as to cause EPA to ignore experiences gained overseas. A good example of this is in Germany. Unlike in the US where we have both a civil and criminal aspects to our legal system, Germany, like most countries, has only the criminal component. This means that routine violations of emissions standards are handled as a criminal matter, not a civil one as they are in the US. A second fundamental difference is only people are defined as "individuals" under the German legal system. Companies and firms are not "individuals", so no action can be taken against a company for a violation. Instead, criminal action is taken against a person, most often the plant manager or person responsible for the combustor, if a violation occurs. German law and custom further dictates that a company not reimburse a person for fines resulting from finding of guilt on such charges. We believe the consequences which result under the German system are far more severe than those in the US. EPA believes, on balance, any dismissal of charges for violations simply makes the German approach very similar in stringency to the US civil approach. The reader should refer to Section 12 of the Technical Support Document Volume IV and Appendix C for a documented account of typical penalties associated with an exceedance in Germany.

EPA concurs with the statement that CEMS averaging periods are different and that more than one averaging period may apply. The reader should refer to Table VII.1. of the proposed rule (p. 17411) for an example of EPA's understanding.

EPA agrees that the devices called "opacity monitors" are used in Europe, but believes these devices, referred to as "extinction meters", are used as PM CEMS and not as measures of opacity. In fact, Germany's work to establish PM CEMS for compliance monitoring started over 20 years ago with testing at a cement plant. In Germany extinction meters are correlated with manual PM measurements to comply with a PM standard typically in the range of 15 to 100 mg/m^3. Extinction meters are operationally similar to opacity monitors, though their data output is configured differently for obtaining greater sensitivity in their low measurement range. The reader is referred to Section 12 of the Technical Support Document Volume IV for an account of how extinction meters are used as compliance monitors at cement plants in Germany.

Finally, EPA also agrees that it is routine for some countries establish site-specific emissions limits, whereby “uncertainty” is added to the emissions standard. Unfortunately, EPA is prohibited from establishing site-specific limits under the Clean Air Act, so such an approach is not feasible here.

3. CEMS Downtime and Data Availability

Comment

CEM1.002(093) Whenever CEMs are required or used as an option by facilities, additional guidance would be helpful in determining downtime allowances. It is obvious that calibration and maintenance is required on these CEMs and it would be detrimental to cease operations at these times. Therefore, it is important to allow adequate downtime for these operations. Forcing operators to cease operations whenever a CEM may fail will likely result in increased emissions overall. Nepera’s captive unit is used not only to burn hazardous waste, but also used as the primary control device for process-related gaseous emissions. Since these fumes are not RCRA-regulated, Nepera could opt to emit direct to atmosphere rather than incinerating them, however, that would result in increased emissions which Nepera opposes. Unfortunately, the Agency’s omission for CEM downtime would force that very event at Nepera and other operating units. For this reason, Nepera urges the Agency to re-evaluate its approach on this matter.

CEM1.005(100)(a) EPA’s specification of 100% on-stream time for CEMs sets the stage for extensive incinerator downtime.

CEM1.007(101)(b) The implication that CEMs must be on-line 100% of the time is a significant disincentive to the use of CEMS. R-P urges EPA to incorporate the concept of minimum data availability, which is incorporated into sections of 40 CFR Part 60 applicable to other emissions sources that require continuous monitoring for compliance with emissions standards. This concept allows for unanticipated downtime of the monitoring instrument for a given parameter and/or a certain amount of instrument operating time which did not meet QA/QC requirements specified in the regulation.

CEM1.009(106) We also urge EPA to set the performance specifications for the CEM in a phased manner to allow time for operators to debug and break-in these CEMs and to integrate them with their process control logic systems. For example, for the first year a 60% on-stream time could be specified with a 20% drift allowance. These standards could be made more stringent for the second year. These performance specifications should be set consistent with the results of EPA’s long term demonstration studies performed in 1996 and 1997.

CEM1.015(114)(a) If mandated, CRWI is very concerned with the requirement that these CEMs be on-line 100% of the time hazardous waste is being burned. Reasonable off-line time must be allowed for calibration, maintenance, and repair. Simply taking a CEM off-line does not result in increased emissions. CRWI supports developing a phase-in scheme where the on-line requirement could be altered as the technology becomes more reliable, especially for mercury and PM monitors. CRWI believes that the way the proposed rule is currently written, there are major disincentives for using CEM technology. CRWI would like to work with the Agency to develop a method that gives incentives to industry for installing and maintaining CEMs.

CEM1.015(114)(b) One large disincentive to installing and operating certain CEMs is the proposed requirement for 100% on-line time. For example, the emissions of PM are not affected by the PM CEM being on-line. PM emissions are impacted by the amount of ash in the feed, operating conditions of the combustion unit, and the operating parameters of the APCD. One could argue that having a PM CEM on-line for 20% of the time would give significantly more emissions data than running a comprehensive performance test every three years.

CEM1.015(114)(c) 2. The proposed rule indicates that all waste feeds must be discontinued when the PM CEMs is inoperable. It is CRWI's understanding that similar sources in Germany are not subject to this requirement and we believe that this requirement will substantially limit process operations. CRWI believes that EPA should further evaluate the practical use of PM CEMs in operating facilities to better determine operating practices. CEM's uptime requirements should be consistent with actual operating experience.

CEM1.015(114)(d) 3. The runtime requirements for PM CEMs should be consistent with the established monitor performance and operating experience. Most state permitting agencies have recognized that there is significant downtime associated with the operation of CMS/CEMs. Many state agencies require permitted sources to track CMS/CEM's runtime and submit monthly or quarterly reports. Enforcement action is only taken in the event of excessive monitor downtime or if the operator has been negligent in instrument maintenance.

CEM1.022(118) The cost associated with shutting down a process could be very large. Allied Signal's SMFPI can operate for approximately one eight-hour shift following liquid waste-feed cutoffs due to waste storage limitations. Additional storage will only add a small additional buffer (at significant capital and permitting cost) due to the capacity limitations of the incinerator. Allied Signal estimates that the cumulative effect of CEM malfunctions could result in incinerator downtime, and hence production downtime in the range of 10-20 %. This is based on Allied Signal's current experience with continuous emission monitoring for CO on the incinerator and for NO_x on another process unit where, a single CEM downtime can approach 10% during a calendar month.

CEM1.026(124)(a) 4.II.B.2. Continuous Emission Monitoring Systems (CEMS) EPA has proposed to require HWCs to be equipped with CEMS for PM, Hg, CO, HC, and O_2. In addition, EPA allows the facilities to elect to use CEMS for compliance monitoring for SVM, LVM, HCl, and Cl_2. CEMS must be operated at all times hazardous waste is fed into or remains in the combustion chamber (61 FR 17379).

DOE points out that the requirement for a CEMS to be operating "at all times hazardous waste is fed" will result in the need for facilities to shut down whenever the CEMS is not operating. DOE believes that it is very onerous to require a facility to shut down every time a CEMS is down, without consideration for the reliability of the CEMS. Estimated availability (operation time per year) for mixed waste units is already much lower at typically 5,000 hours, or less (around 501/o availability) than typical hazardous waste incinerators (which are at around 90% availability), due to operating and maintenance issues related to the radiological containment. DOE feels that to impose added risk of shutdown from inadequately demonstrated and difficult to operate CEMS (that may be unreliable) is not reasonable. DOE suggests that a more reasonable requirement would be for EPA to allow facilities to assess the up-time of the CEMS and then calculate some percentage of down time from there.

CEM1.028(127)(a) Continuous Emissions Monitoring Systems (CEMS) — The proposed application of CEMS to HWCs should be modified to.... Define conditions under which hazardous waste incineration may be continued when a CEMS (other than the CO monitor) is temporarily off-line.

CEM1.028(127)(c) Citations: Part 63.1210(a) Continuous emissions monitors (CEMS). (1) HWCs shall be equipped with CEMS for PM, Hg, CO, HC, and O_2 for compliance monitoring,except as provided by paragraph (a)(3). Owners and operators may elect to use CEMS for compliance monitoring for SVM, LVM, HCl and Cl_2.

(2) At all times that hazardous waste is fed into the HWC or remains in the combustion chamber, the CEMS must be operated in compliance with the appendix to this subpart.

Comments and Recommendations:

1. Incineration of hazardous waste will be precluded whenever any one of the required CEMS is out of compliance with the corresponding performance specifications. Continuous measurement of the CO concentration in the stack gas is important for combustion system process control. However, it is unclear why limited allowances of off-line time for the other CEMS (in addition to the off-line time of 20 minutes for calibration purposes specified in the proposed rule) should not be allowed. Long-term verification of adequate emissions control performance between performance tests is the real potential advantage of CEMS, not documentation of short-term perturbations. Ciba recommends that the EPA specify a CEMS data availability requirement of less than 100% (with the actual value to be derived, at least in part, from the results of the EPA's CEMS field test program currently underway).

CEM1.028(127)(e) provision to allow continued hazardous waste incineration when an instrument is temporarily off-line so long as the regulatory authority is notified and prompt corrective action is taken,

CEM1.028(127)(g) In addition, the Swiss regulatory authorities allow limited hazardous waste incineration during CEM failure periods, so long as continuous monitoring of the emission parameter concerned is not required for process control. If a CEM monitor fails, the authority is informed and repair of the malfunction is completed as quickly as possible (normally within 24 or 48 hours). Depending on the situation, incineration of certain waste categories may be restricted during the period of analyzer failure.

The proposed rule should be modified to allow facilities to develop contingency plans for continued hazardous waste incineration when any one of the required CEMS (other than the CO monitor) is out of specification. Such plans could entail a) allowance for short-term outages while rapid repairs are effected per the European model, or b) reversion to conventional feed rate and operating parameter restrictions for a limited time until the CEMS problem is resolved.

CEM1.002(128) D. The proposed requirement for 100% on-line time for CEMs is unrealistic.

CMA urges EPA to recognize that CEM instruments are not 100% reliable. Allowances for routine maintenance and calibration needs to be incorporated into the rule. Since emissions upon startup and shutdown of a combustor can be higher than those during normal operation, by requiring shutdown in the event of instrumentation failure or maintenance, the rule may cause an increase in emissions from combustors. Continued operation of the process during periods of calibration and maintenance should be allowed, provided process operating parameters remain within normal ranges. Under such conditions, there is no reason that excess emissions would occur during CEM downtime. Further, CMA contends that relatively steady-state operation of a combustor will result in lower overall emissions than a unit that is subjected to multiple startups and shutdowns.

CMA also calls the Agency's attention to the impact of multiple instruments with low reliability on a unit's operating capacity. If a unit is forced to shut down upon instrument failure, then that unit is only running as often as the least reliable instrument monitoring its operation. Further, multiplication of all the instruments' reliability factors will yield the actual uptime for a unit that is forced to shut down upon instrument failure. For example, if just three instruments of 75% reliability were to be required, then a unit's capacity becomes (0.75 x 0.75 x 0.75), or only 42% of its normal capacity. Therefore, unless backups for every instrument are present, a unit's capacity soon becomes severely restricted when instruments of poor reliability, such as what is proposed in this rule, are required to be installed.

EPA has proposed to require that hazardous waste combustors must immediately cease burning hazardous wastes whenever "a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications" 17441. Such a "100% data availability" requirement poses serious potential problems for hazardous waste combustion facilities, because the proposed rule requires the use of multiple CEMS, some of which (i.e., the mercury and PM CEMS) are unproven and of questionable accuracy and reliability, thus raising the likelihood of a CEM failure necessitating a waste feed cutoff. Depending on the frequency and duration of such shutdowns, companies that rely on captive incinerators to dispose of hazardous wastes could face capacity shortages which, in turn, could adversely affect production operations. Faced with such a prospect, facilities that rely on on-site incinerators would be forced to install back-up CEM systems in an attempt to ensure that, at any given time, a CEM for each of the relevant emissions parameters would be operational. The costs of installing, operating, and maintaining such a redundant system should at least double the already understated cost estimates in EPA's proposed rule.

To avoid such an unreasonable outcome, EPA should incorporate into the final hazardous waste combustor MACT rule provisions to address the concept of minimum data availability to allow for unanticipated downtime. Such an approach has been taken in Clean Air Act permits, as well as EPA's CAA rules. For example, the data availability requirements set forth in EPA's new (Subpart EC) MWC NSPS specify that, for sulfur dioxide, "[a]t a minimum, valid paired continuous monitoring system hourly averages shall be obtained ... for 75 percent of the operating hours per day for 90 percent of the operating days per calendar quarter that the affected facility is operating and combusting MSW." 60 Fed. Reg. 65429 (Dec. 19,1995) (codified at 40 CFR § 60-58b(e)(7)). Similarly, EPA's old (Ea) NSPS for MWCs specifies that, "[a]t a minimum, valid CEMS data for [CO], steam or feedwater flow, and [PM] control device inlet temperature shall be obtained 75 percent of the hours per day for 75 percent of the days per month the affected facility is operated and combusting MSW." 60 Fed. Reg. 65387 (Dec. 19,1995) (codified at 40 CFR § 60.58a(h)(10)). See also subpart G of the HON at § 63.152(c)(2)(ii)(A)(2).

Alternatively, the frequency of emissions data collection for hazardous waste combustors could be based on the potential risk posed by each pollutant of concern. For example, instantaneous CO emissions data are of greater importance than instantaneous PM data. To implement such an approach, a facility-specific Quality Assurance Plan could be developed.

CEM1.035(129)(a) One of the problems in this rule is that if your CEM is offline, hazardous waste feed must cease. Being able to purchase a CEM does not address operational reliability. Reliable commercial availability of PM and Hg monitors has not been demonstrated in the United States. Other parts of the system (sampling train, data acquisition, etc.) may also be sources of CEM failures, especially when installing new technology.

CEM1.035(129)(c) CEMS ONLINE TIME Problem The proposed MACT Rule encourages the use of CEMS. The rule, however, requires the CEM to be accurately measuring the pollutant being monitored 100% of the time and defines continuous monitoring as sampling at 15 seconds intervals. This is more restrictive than the requirements for other emission sources.

Sections of the 40 CFR 60 applicable to other emission sources that require continuous monitoring for compliance with emission requirements utilize the concept of minimum data availability. This allows for unanticipated downtime of the monitoring instrument for a given parameter and/or a certain amount of instrument operating time which did not meet QA/QC requirements specified in the regulation. This concept has not been incorporated into this proposed rule.

Discussion — Comparisons to Requirements for Other Air Emission Sources

1. Current Performance Specifications and Test Procedures for Continuous Emission Monitoring Systems for Air Emission Sources (40 CFR 60) Are Less Stringent than the Combination of Specifications and Quality Assurance Procedures Proposed in the MACT Rule.

Currently, Performance Specifications found in 40 CFR 60 Appendix B and Quality Assurance Procedures in Appendix F are applicable to other air emission sources. Specification 4A of Appendix B for Carbon Monoxide Continuous Monitoring Systems refers to 40 CFR 60.13 which specifies a minimum cycle of operation of one cycle (sampling, analyzing and data recording) for each successive 15-minute period. This section also specifies that all continuously monitored parameters other than opacity shall be 1-hour averages computed from four or more data points equally spaced over each 1-hour period. Data recorded during continuous monitoring system breakdowns, repairs, calibration checks, zero and span adjustments shall not be included in the data averages.

The more stringent proposed rule specifies that rolling averages be based on some (specified) time period, calculated every minute from a one minute average of four measurements taken at 15 second intervals.

QA procedures of Appendix F specify the minimum QA requirements necessary to control and assess the quality of CEMs data that are used for demonstration of compliance. This appendix defines “out of control period” with respect to daily calibration and quarterly audits. There is also reference to minimum daily data requirement which has been used commonly by the power industry.

This concept has also been applied to 60.47a (applicable to Electric Utility Steam Generating Units) as it applies to continuous emission monitoring for sulfur dioxide in that this owner shall obtain emission data for at least 18 hours in at least 22 out of 30 successive boiler operating days.

The more stringent proposed rule specifically supersedes Appendix F with Appendix to Subpart EEE applicable to hazardous waste burning devices only. The only downtime of the CEM allowed is downtime due to calibration (20 minutes while calibrating a CEM).

2. Other Less Restrictive Guidelines for CEMs Performance Specifications and Quality Assurance Requirements Are Applied to Municipal Waste Combustion Facilities

In September 1990, guidelines were prepared for the Northeast States for Coordinated Air Use Management (NESCAUM) under an EPA contract. NESCAUM recommended that states adopt regulations which require the use of CEMs to determine compliance with emission standards on a continuous basis at MWC facilities. The recommendations were:

- Establish initial certification procedures and requirements for CEMs
- Define quality assurance procedures and criteria for the ongoing determination of the acceptability of the CEMs and the monitoring data.
- Specify minimum data capture requirements

Further, it was recommended that 40 CFR 60, including 60.13 “Monitoring Requirements”, and Appendices B and F be utilized as a working base for the state regulations. This approach extended the concepts of the Clean Air Act rather than RCRA and therefore recognized that cycle time/response time of 15 seconds is or should not be applicable to most CEM parameters. It also recognized the need for establishing minimum data availability on CEM data for an incinerator operation similar to that applied to other air emission sources.

NESCAUM recommends the cycle time response time specification for SO_2, NO_x, diluent and HCl monitors be 15 minutes which is consistent with 40 CFR 60.13. A one minute cycle time/response time specification is included for CO monitors. A minimum data availability specification of 90% of source operating hours is included. Minimum data availability requirements (90%) are based upon the reporting period, suggested to be quarterly. Corrective action in the event the CEM cannot meet or did not meet the minimum requirement is suggested to include alternative monitoring procedures subject to approval of the regulatory agency. These alternative monitoring procedures are recommended to be included in the QA plan for the facility.

3. Other Less Restrictive Guidelines for CEMs Performance Specifications and Quality Assurance Requirements Are Applied to Waste Combustion Facilities in Germany As stated in Chapter 2, Volume IV of EPA’s Technical Support Documents to the MACT Rule: “The German approach to the use of CEMS for compliance monitoring is based on the application of practical engineering philosophy. CEMS are employed, despite the known sensitivities to various factors such as particle composition and size distribution, within the statistical limitations determined by a site specific calibration procedure that defines the statistical relationship between CEMS response and PM loading. The reliability of the CEMS and the statistical relationships are assured as best as possible through performance based CEMS

> specifications and suitability testing and other long term tests run on plants at normal operating conditions using both CEMS and manual methods. This allows the development of confidence in the utility of the CEMS."

Table 2-4 of the above referenced document compares German regulation for PM CEMs with the proposed EPA regulation. This comparison shows the more stringent approach by EPA has not incorporated the concept of data availability (none by EPA vs. > 90% by the Germans).Comparison of the EPA proposed QA also illustrates the proposed requirement by EPA for more frequent instrument response checks (Absolute Calibration Audits) (Quarterly vs. yearly) and calibration checks (Relative Calibration Audits) (Every 18 months vs. 5 years).

Similar review of the Preamble to the MACT Rule Part Five, 11, C. 7. indicates a willingness by EPA to accept much of the German approach to using CEMS. However, EPA's approach does not apply some of the key factors that are part of the German's "application of a practical engineering philosophy" including:

- TUV equivalent certification (laboratory plus onsite "trial period" for suitability testing)
- Establishment of a combustion unit specific maintenance interval
- Data availability > 90%
- A more reasonable frequency of calibration (3 - 5 years)
- A more reasonable measure of valid data (minimum of 20 minutes per half hour averaging period)
- Development of an uncertainty factor during calibration which is used to determine the actual measured site specific value which is an exceedance of the standard (emission limit plus uncertainty)

<u>Workable Solution</u>

Apply more of the "German Approach". Base the frequency of collection on the pollutant-specific needs. The need for short-term (e.g., 15 second) CO response may be far more valuable in the control of process emissions than short-term particulate or metals emissions information. Incorporate the concept of data availability for all CEMS. Allow the use of process parameter monitoring to measure compliance assurance when the CEMs is not operational (e.g., air pollution control [APC] parameters when CEM for particulate is off-specification).

CEM1.039(130) We also urge EPA to set the performance specifications for the CEM in a phased manner to allow time for operators to debug and break-in these CEMs and to integrate them with their process control logic systems. For example, for the first year a 60% on-stream time could be specified with a 20% drift allowance. These standards could be made more stringent for the second year.

CEM1.040(137) WTI welcomes EPA's encouragement to use CEMS for PM, mercury, and other heavy metals to prove compliance with the proposed emission standards. However, in order for an operator to take advantage of these new technologies the rule must recognize that a certain amount of down-time will be incurred. The rule should allow a given percentage of CEM unavailability (e.g., 15%) without jeopardizing the operator's ability to demonstrate compliance. Without this provision few if any facility operators will take the opportunity to install these new systems and the goal of maximizing their use will not be achieved.

CEM1.043(141) Such reported CEMS performance problems and maintenance requirements could result in frequent, unplanned PM CEMS down-time. As discussed further below, depending on the frequency and duration of such shutdowns, companies such as Lilly that rely on on-site incinerators to treat hazardous wastes could face capacity shortages and operational problems, as EPA has proposed to require that hazardous waste combustors immediately cease burning hazardous wastes whenever “a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications.” 61 Fed. Reg. at 17,441. It is simply unacceptable for EPA to subject hazardous waste combustors to such a draconian requirement when the Agency itself recognizes that the compliance technology that it would force industry to install and operate has not been adequately demonstrated and is potentially unreliable. In addition, the Agency has recognized in the land disposal restrictions standards that incineration is a key element in a protective waste management plan: for most organic waste streams, not only is incineration the most protective means of treatment, it is in fact the required the LDR treatment standard.

CEM1.050(144)(a) 5. CEMS requirements should have greater flexibility. EPA Proposal: PM and mercury (Hg) real-time monitors are required and metals real-time monitors are optional.

Concern: The Agency has not demonstrated the real-time Hg or PM monitors will work reliably under the range of conditions they must operate, but the proposed rule requires installation in all facilities with a 100% on-line requirement. Continuous samplers are not allowed by the rule although they are feasible and give representative emissions determinations for metals, PM, and Hg. Continuous samplers are economical if monthly averaging times are used. Two papers are enclosed which show why monthly averaging times for metals will protect human health and are consistent with RCRA and CAA requirements.

Kodak Recommendation: Hg and PM monitors should not be required. Provisions that allow the optional use of continuous samplers in addition to real-time monitors for metals and PM should be added to the rule. Compliance averaging times of one month should be instituted to make continuous samplers feasible.

CEM1.050(144)(b) The 100% on-line reliability requirement is particularly troubling, since there is no evidence that the monitors [Editor’s note: Hg CEMS] will have good reliability.

CEM1.050(144)(c) The 100% on-line reliability requirement is particularly troubling, since there is no evidence that the monitors [Editor’s note: PM CEMS] will have good reliability.

CEM1.050(144)(d) D. An allowance for 10% downtime and flexibility in specifications of CEMS should be included in the rule.

The rule requires that the CEMS accurately measures the pollutant being monitored 100% of the time. This is more restrictive than the requirements for other emission sources. §63.6(e)(3) which describes the startup, shutdown, and malfunction plan is applicable to MACT monitoring requirements for other emission sources. §60.13(e) for new sources allows for unanticipated downtime of the monitoring instrument for a given parameter and/or a certain amount of instrument operating time which did not meet quality assurance/quality control (QA/QC) requirements specified in the regulation.

QA procedures of Appendix F of 40 CFR Part 60 for new sources specify the minimum QA requirements necessary to control and assess the quality of CEMS data that is used for demonstration of compliance. This appendix defines “out-of-control period” with respect to daily calibration and quarterly audits. There is also a reference to a minimum daily data requirement which has been used commonly by the power industry. This concept has also been applied to Municipal Waste Combustors (MWC). An example of a minimum daily data requirement from §60.47(a) (applicable to Electric Utility Steam Generating Units) as it applies to continuous emission monitoring for sulfur dioxide is that the owner shall obtain emission data for at least 18 hours in at least 22 out of 30 successive boiler operating days.

CEM1.056(153)(a) IX. CONTINUOUS EMISSION MONITORING SYSTEMS (CEMS)

A. CEMS On-Line Time (61 Fed. Reg. at 17,441) The proposed MACT Rule requires a continuous emission monitor (CEM) to accurately measure the pollutant being monitored 100% of the time that hazardous waste is being fed to the combustion unit. In addition, the rule defines continuous monitoring as sampling at 15 second intervals. These requirements are more restrictive than the requirements for other air emission sources.

Sections of 40 CFR 60 applicable to other emission sources that require continuous monitoring for compliance with emission requirements utilize the concept of minimum data availability. This allows for unanticipated downtime of the monitoring instrument for a given parameter and/or a certain amount of instrument operating time which did not meet QA/QC requirements specified in the regulation. Incorporation of this concept into the proposed rule needs to be considered, especially for emerging CEM technology, so that the use of CEMs does not result in excessive cost and/or downtime of the units choosing to use this method for demonstration of compliance with MACT Emission Standards.

Currently, performance specifications found in 40 CFR 60 Appendix B and quality assurance (QA) procedures in Appendix F are applicable to other air emission sources. Specification 4A of Appendix B for Carbon Monoxide Continuous Monitoring Systems refers to 40 CFR 60.13 which specifies a minimum cycle of operation of one cycle (sampling, analyzing, and data recording) for each successive 15-minute period, instead of the 15-second period mandated by the proposed MACT Rule. This section also specifies that all continuously monitored parameters other than opacity shall be 1 -hour averages computed from four or more data points equally spaced over each 1-hour period. the Agency specifies that data recorded during continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in calculating the data averages.

QA procedures of Appendix F specify the minimum requirements necessary to control and assess the quality of CEMs data that is used for demonstration of compliance. This Appendix defines “out-of-control period” with respect to daily calibration and quarterly audits. There is also reference to a minimum daily data requirement which has been used commonly by the power industry. This concept has also been applied to Municipal Waste Combustors (MWCs). An example of the minimum daily data requirement from 40 CFR 60.47a (applicable to Electric Utility Steam Generating Units) as it applies to continuous emission monitoring for sulfur dioxide is that the owner shall obtain emission data for at least 18 hours in at least 22 out of 30 successive boiler operating days. The more stringent proposed rule specifically supersedes Appendix F with Appendix to Subpart EEE applicable to hazardous waste burning devices only. The only downtime of the CEM allowed is downtime due to calibration (20 minutes while calibrating a CEM). Consideration needs to be given to real world conditions and allow for additional CEM downtime, especially for developing instruments. Also, several of the pollutants being measured by CEMS, or that could be measured by CEMS, do not present short-term emission concerns (e.g., PM, Hg, HCl, SVM, LVM). Therefore less frequent CEM data collection for some part of an hour, or even some part of a day, as is allowed for other emission sources would neither represent a lack of control of these emissions within the emission standard limits, nor would they pose unacceptable risk to potential receptors. Data will be available that is representative of actual emissions using the CEM, even one that is not operating 100% of the time. It is not necessary to have 100% sampling of process products to be assured that the product is within specification. This concept, known as statistical process control, is incorporated by the Agency in its groundwater monitoring requirements for Subtitle D landfills.

There are other less restrictive guidelines for CEMs performance specifications and quality assurance requirements that are applied to municipal waste combustion facilities. These guidelines were prepared for the Northeast States for Coordinated Air Use Management (NESCAUM) under an EPA contract. NESCAUM recommended that states adopt regulations which require the use of CEMs to determine compliance with emission standards on a continuous basis at MWC facilities. This recommendation included specification of minimum data capture requirements and that 40 CFR 60, including 60.13 ‘Monitoring requirements’, and Appendices B and F be utilized as a working base for the state regulations.

NESCAUM specifies that the sampling time for SO_2, NO_x, diluent, and HCl monitors be 15 minutes which is consistent with 40 CFR 60.13. A one-minute cycle time/response time specification is included for CO monitors. A minimum data availability specification of 90% of source operating hours is included. Minimum data availability requirements (90%) are based upon the reporting period, suggested to be quarterly. Corrective action in the event the CEM cannot meet or did not meet the minimum requirement is suggested to include alternate monitoring procedures subject to approval of the regulatory agency. These alternate monitoring procedures are recommended to be included in the QA plan for the facility. This approach allows the user of the CEM more flexibility in operation, which will be extremely important for developing CEMS, and allows the agency more flexibility to work with the operator to achieve the overall goal of good HWC operations coupled with reducing emissions of certain pollutants. Other less restrictive guidelines for CEMs performance specifications and quality assurance requirements are applied to waste combustion facilities in Germany. Chapter 2, Volume IV of EPA’s Technical Support Documents to the MACT Rule describes the “German Approach” to use PM CEMS, and shows the more stringent approach by EPA has not incorporated the concept of data availability (none by EPA vs. > 90 % by the Germans). It also points out that valid data in Germany represents 20 minutes of valid measurements per half-hour averaging time. This “German Approach” is more similar to that of 40 CFR 60 as applied to other air emission sources and the specifications of NESCAUM applied to MWCs as described above.

CWM proposes the following solution which incorporates allowed downtime of the CEM into its use without requiring process interruption for that downtime. The approach is similar to that taken by the EPA for other emission sources, NESCAUM for MWCS, and the Germans for hazardous waste combustors in that country.

- Establish pollutant-specific data collection needs (cycle time/response time, definition of valid data) in a Quality Assurance Plan Guidance Document. Separation from the Rule will allow more flexibility for changing these needs with developing data on pollutants, and instrumentation availability and capability;
- Allow the concept of data availability (similar to 40 CFR 60 Appendix F) to be incorporated into the Quality Assurance Plan for the specific unit;
- Base the data availability goal on actual availability established over some specified period of time while initially using the CEM at a user site. (Similar to suitability testing under the German Certification by TUV);

CEM1.056(153)(b) Similar to the NESHAP approach, if the CEM data availability falls below the goal established, corrective action would include the use of the specified alternative monitoring in the site Quality Assurance Plan.

CEM1.059(157)(a) 4) The requirement for 100% CEM on-line time is not realistic. EPA has allowed less than 100% on-line time in other rules (Clean Water Act - continuous pH monitoring/Clean Air Municipal Waste Combustor New Source Performance Standard). As proposed, the rule requires that hazardous waste feed be immediately discontinued whenever “a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications.”

CEM1.063(170) Finally, the proposal requires that CEMS accurately measure the pollutant being monitored 100% of the time (61 FR 17443) . The proposal defines continuous monitoring as sampling at 15-second intervals. This is more restrictive than the requirements for other emission sources. Sections of 40 CFR 60 (see Subpart Cb for example) applicable to other emission sources that require continuous monitoring for compliance with emissions limits utilize the concept of minimum data availability (typically 75 percent of the hours in a day, 90% of the days in a year). This allows for unanticipated downtime of the monitoring instrument for a given parameter and/or a certain amount of instrument operating time which did not me et the QA/QC requirements specified in the regulation. Also, other less restrictive guidelines for CEMS performance specifications and quality assurance requirements are applied to waste combustion facilities in Europe. Although the background documents of the proposed rule [Footnote 199: Technical Support Documents to the MACT Rule, Chapter 2, Volume IV.] reference the German approach for the use of CEMS for compliance monitoring and the preamble to the proposal (part 5, II, C.7) indicates a willingness by EPA to accept much of the German approach to using CEMS, the proposal itself fails to incorporate some of the key aspects that are a crucial part of the “application of a practical engineering philosophy” in Germany. These include:

- TUV equivalent certification (laboratory plus on-site “trial period” for suitability testing)
- Establishment of a combustion unit specific maintenance interval

- Data availability >90%
- A more reasonable frequency of calibration (3-5 years)
- A more reasonable measure of valid data (minimum of 20 minutes per half-hour averaging period)
- Development of an uncertainty factor during calibration which is used to determine the actual measured site-specific value which is an exceedance of the standard (emission limit plus uncertainty)

The German requirements found in the 17th BImSchV are virtually identical to the EU requirements. Copies of both these regulations are provided. (See Attachments 9 & 10, Also see Appendix K).

Adopting a CEMS monitoring concept without the appropriate implementation and compliance aspects makes it unworkable. In order to improve the practical implementation of CEMS systems at impacted facilities, CKRC urges the Agency to modify the proposal to incorporate flexibility and reflect more of the German approach with respect to data availability, calibration frequency, percentage up-time, etc.

In addition, CKRC strongly disagrees with the Agency's implication that simply because CEMs are used in Europe they should be used in the U.S. regardless of their availability or stage of development, and without consideration of the specific implementation elements that accompany the monitoring requirements in Europe. CKRC provides an important review of the EU rules and experience regarding monitoring requirements on operations in Appendix K.

CEM1.072(181)(a) Table 2-4 of the support document summarizes other German and EPA regulations. German regulations allow a greater than 90% data availability, the EPA regulations allow for no downtime.

CEM1.072(181)(b) VII. Eastman Proposes That the Agency Should Include a Provision for CEMS Downtime to Allow for Instrument Maintenance and Repair

The proposed Hazardous Waste Combustor MACT Rule has no provision for Continuous Emission Monitoring Systems (CEMS) maintenance and repair which occurs during normal operation of CEMS. At 61 FR 17441 the Agency states: "... HWCs cannot burn hazardous wastes if the CEMS is not meeting performance specifications." This provision requires 100 percent data capture for all CEMS which is not a reasonable nor realistic requirement.

All air rules which require continuous emission monitoring allow for some periods of maintenance and repair during operation of the CEMS. For example, the New Source Performance Standard (NSPS) for industrial-commercial- institutional steam generating units (Subpart Db / 40 CFR Part 60) allows for 25 percent CEMS downtime. The Clean Air Act Amendment (CAAA) requirements for Title III are contained in 40 CFR Part 75 - Continuous Emission Monitoring. These rules provide procedures for reporting when less than 95 or 90 percent data capture is realized. Finally, the General Provisions of the NESHAP for Source Categories (40 CFR, Part 63, Subpart A, Sec. 63.8(c)(4)) states: (4) Except for system breakdown, out-of-control periods, repairs, maintenance periods, calibration checks, and zero (low-level) and high- level calibration drift adjustments, all CMS, including COMS and CEMS, shall be in continuous operation and shall meet minimum frequency of operation requirements...

Even the German regulations which the Agency relies heavily on in discussion of particulate matter (PM) and mercury CEMS allows for a 90 percent data capture. Based on these regulatory citations, it is apparent that there is recognition that 100 percent data capture for a CEMS is neither attainable nor reasonable as a regulatory requirement.

Eastman has considerable day-to-day operating experience with CEMS. Eastman currently operates 16 CEMS that monitor oxygen (O_2), carbon monoxide (CO), sulfur dioxide (SO), nitrogen oxides (NO_x) and total hydrocarbons (THC) on various combustion sources. With appropriate preventive maintenance and daily checks Eastman has managed to obtain a 98 percent uptime record. All of the CEMS that Eastman currently maintains and operates are extractive with sample conditioning. Over the years Eastman has rermed the sample conditioning systems to assure that the gas stream going to the analyzer is properly filtered and that moisture is removed to the extent possible. Eastman has determined that uptime of the analyzers are directly related to the sample conditioning systems. The CEMS that the Agency has proposed as a part of this rulemaking are generally insitu (i.e., PM) or must analyze an unconditioned gas sample (i.e., Hg and heated THC). Eastman has had limited experience with instruments which that utilize a sample stream which is not conditioned. Eastman has operated a heated THC analyzer on a coal fired BIF for approximately 1 year. This experience indicated that these analyzers required considerably more maintenance and attention than their unheated counterparts which utilized a conditioned sample stream.

Over the past 10 years the CEMS Industry has changed dramatically due to the increase in regulations that require CEMS and the regulated industry demanding more reliable and durable CEMS. Instruments for the criteria pollutants are readily available and have proven reliability and durability. However, the Agency is proposing that new (i.e., PM, Hg) continuous measurements be made with the same reliability that the established measurements be made. It took many years of practical experience to bring the CEMS industry to the point it is at today for the criteria pollutants. The Agency believes that for these new continuous measurements that the current level of reliability can be attained within three years. Eastman does believe that this can be accomplished.

For these reasons Eastman believes that the Agency must allow for CEMS downtime for maintenance and repair in the HWC MACT rule. It seems reasonable that the German standard of 90 percent data capture could be easily adopted since this information was utilized to justify the use of PM and Hg CEMS in the rule.

CEM1.074(182) 2. Dow believes that the requirement of having all monitors to be operational at all times, considering the on line experience with most devices, is not realistic. In fact, this requirement will drive most facilities to opt for feed controls rather than install continuous emission monitors.

There have been a number of times that Dow has experienced several day outages of NO_x and SO_x instrument at its 830 rotary kiln in Midland. On occasion even working around the clock, it took several days to determine the nature of the problem and correct it. Currently Dow’s 830 air permit in Midland allows 15 days per quarter of outage on this particular instrument. If the flexibility was not in our permit, we would have had to have stayed down for the several days even though the probability of exceeding a permit parameter was extremely small.

German regulations allow 10% down time with instruments as long as the owner/operator uses diligence in making repairs. In addition, in Germany it is also acceptable to be out of compliance for short periods of time. So, although their standards are stricter numerically, in effect they are more flexible and much easier to comply with.

Air permits have typically allowed a 15% off line time for instruments. This is a much more realistic value and as long as the facility operator diligently tries to bring the device back on line, this should be adequate. With this flexibility, most facilities may think it advantageous to institute continuous emission monitors on all of the specified parameters. To address this, EPA should delete § 63.1210(a)(2).

CEM1.076(183) It is not practical to require that CEMs be on-line 100% of the time that hazardous waste is being burned. Reasonable off-line time must be allowed for calibration, maintenance, and repair. Simply taking a CEM off-line does not result in increased emissions.

CEM1.079(187) IV. IMPLEMENTATION ISSUES A. Monitoring Requirements
The routine monitoring and testing requirements that currently apply to facilities subject to the BIF Rule already impose substantial burdens upon burners of hazardous waste fuel. The inevitable failures and downtime associated with this monitoring equipment result in waste fuel cutoffs and interruptions of operations. The associated calibration and testing requirements is time-consuming and expensive. Although Solite understands the need for continuous monitoring, we feel that EPA is insufficiently cognizant of the trade-offs involved. The more monitoring devices that are required, the more cutoffs and shutdowns will occur purely because of problems with the devices themselves. In the case of a rotary kiln, it is desirable from both a production and an environmental standpoint to maintain stable conditions in the kiln. Startups and shutdowns are associated with higher emissions than during normal operation. The kilns and associated equipment deteriorate faster and require more repairs when they frequently undergo the drastic temperature changes associated with startup and shutdown. Accordingly, additional continuous monitoring tied to an AWFCO system should only be required when it substantially enhances EPA's ability to assure compliance. If alternative means are available to ensure compliance the negative aspects of CEMS greatly outweigh their benefits.

CEM1.080(188) Finally, in addition to the increase in costs for compliance, the related CEMS and instrumentation affects the system availability - the time the system can be operating without potential trips. OxyChem's estimated on-stream time after reviewing operation of all CEMS including a mercury and particulate analyzer, and spare on-line parallel operating systems (required for continuous operations), is approximately 87%. Without the mercury and particulate CEMS (additional review of the CEMS requirements indicate that calibration of the particulate matter CEMS at the low levels are extremely difficult to maintain, if at all.), the availability of the system could be greater than 99% (excludes scheduled downtime, for activities such as tube cleaning or refractory repair). *Therefore, OxyChem recommends that EPA remove requirements for the mercury and particulate CEMS due to the lack of reliability that would cause operational difficulty resulting in significant downtown, lost production and increased combustion costs.*

CEM1.083(202) Issue: Requirement for 100% on-line time for CEMs is restrictive.
No instrument will ever be 100% on-line and reliable. Allowances for routine maintenance and calibration need to be incorporated into the proposed rule. EPA has proposed to require that hazardous waste combustors must immediately stop burning hazardous waste whenever a CEM component is not in compliance with applicable quality assurance procedures or performance specifications. A 100% data availability requirement would require the use of multiple CEMs to ensure that, at any given time, a CEM for each emission parameter would be operational. This concern is real since the proposed rule requires the use of multiple CEMs, some of which (mercury and PM CEMs) are unproven and of questionable accuracy and reliability. The expense of installing, operating, and maintaining such a redundant system will more [than] double EPA's CEMs cost estimates.

EPA should adopt a realistic 90% on-line time for CEMs while excluding routine maintenance and calibration downtime in the on-line time calculation.

CEM1.086(205) TCC suggests that EPA consider some operating time requirement [such at the 75% operating time required in 40 CFR section 60.48b(f)] for PM, Hg, HC, and any other CEMS, and only stipulate full operating time for the CO monitor. Note that when the other CEMs are off-line, feed quality and rate and other operating parameters could be used to demonstrate ongoing compliance. TCC member companies are very concerned about the maintenance and performance of newly devised, unproven CEMs having regulatory requirements. And, TCC is concerned that EPA provides no time for preventative maintenance in its operating time requirements. Sites will be driven to complete dual systems (with spares), including complete dual data acquisition systems.

CEM2.054(202) Issue: Requirement for 100% on-line time for CEMs is restrictive. No instrument will ever be 100% on-line and reliable. Allowances for routine maintenance and calibration need to be incorporated into the proposed rule. EPA has proposed to require that hazardous waste combustors must immediately stop burning hazardous waste whenever a CEM component is not in compliance with applicable quality assurance procedures or performance specifications. A 100% data availability requirement would require the use of multiple CEMs to ensure that, at any given time, a CEM for each emission parameter would be operational. This concern is real since the proposed rule requires the use of multiple CEMs, some of which (mercury and PM CEMs) are unproven and of questionable accuracy and reliability. The expense of installing, operating, and maintaining such a redundant system will more [than] double EPA's CEMs cost estimates. EPA should adopt a realistic 90% on-line time for CEMs while excluding routine maintenance and calibration downtime in the on-line time calculation.

CEM5.041(128)(e) Such reported CEMS performance problems and maintenance requirements could result in frequent, unplanned PM CEMS down-time. As discussed further below in section IV.C, depending on the frequency and duration of such shutdowns, CMA member companies that rely on on-site incinerators to dispose of hazardous wastes could face capacity shortages and operational problems, as EPA has proposed to require that hazardous waste combustors immediately cease burning hazardous wastes whenever "a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications." 17441. It is simply unacceptable for EPA to subject hazardous waste combustors to such a draconian requirement when the Agency itself recognizes that the compliance technology that it would force industry to install and operate has not been adequately demonstrated and is potentially unreliable.

CEM8.001(097) C. Requirement for 100% on-line time for CEMs is unrealistic Vulcan Chemicals urges EPA to recognize the reality that no instrument will ever be 100% reliable. Allowances for routine maintenance and calibration needs to be incorporated into the rule. Since emissions upon startup and shutdown of a combustor are higher than those during normal operation, by requiring shutdown in the event of instrumentation failure or maintenance, the rule will be directly responsible for an increase in emissions from combustors. Further, Vulcan Chemicals contends that relatively steady-state operation of a combustor will result in lower overall emissions than a unit that is subjected to multiple startups and shutdowns.

Vulcan Chemicals also calls the agency's attention to the impact of multiple instruments with low reliability on a unit's operating capacity. If a unit is forced to shut down upon instrument failure, then that unit is only running as often as the least reliable instrument monitoring its operation. Therefore, unless backups for every instrument are present, a unit's capacity soon becomes severely restricted when instruments of poor reliability, such as what is proposed in this rule, are required to be installed.

EPA has proposed to require that hazardous waste combustors must immediately cease burning hazardous wastes whenever "a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications" 61 Fed. Reg. 17,44 1. Such a "100% data availability" requirement poses serious potential problems for hazardous waste combustion facilities, because the proposed rule requires the use of multiple CEMS, some of which i.e.. the mercury and PM CEMS) are unproven and of questionable accuracy and reliability, thus raising the likelihood of a CEM failure necessitating a waste feed cutoff. Depending on the frequency and duration of such shutdowns, companies that rely on captive incinerators to dispose of hazardous wastes could face capacity shortages which, in turn, could adversely affect production operations. Faced with such a prospect, facilities that rely on on-site incinerators would be forced to install back-up CEM systems in an attempt to ensure that, at any given time, a CEM for each of the relevant emissions parameters would be operational. The costs of installing, operating, and maintaining such a redundant system should at least double the already understated cost estimates in EPA's proposed rule. To avoid such an unreasonable outcome, EPA should incorporate into the final hazardous waste combustor MACT rule provisions to incorporate the concept of minimum data availability to allow for unanticipated downtime. Such an approach has been taken in Clean Air Act permits, as well as EPA's CAA rules.

CEM9.002(114)(c) NESCAUM recommended that the cycle tine/response time specification for SO_2, NO_x, and HCl monitors be 15 minutes which is consistent with 40 CFR 60-13. A one-minute cycle time/response time specification is included for CO monitors. A minimum data availability specification of 90% of source operating hours is included. Minimum data availability requirements (90%) are based upon the reporting period, suggested to be quarterly. Corrective action in the event the CEM can not meet or did not meet the minimum requirement is suggested to include alternate monitoring procedures subject to approval of the regulatory agency. These alternate monitoring procedures are recommended to be included in the QA plan for the facility.

CEM1.NOD.007(233)(a) 4.II.B.2. Continuous Emission Monitoring Systems (CEMS): EPA has proposed to require HWCs to be equipped with CEMS for PM, Hg, CO, HC, and O_2.. In addition, EPA allows the facilities to elect to use CEMS for compliance monitoring for SVM, LVM, HCl, and Cl_2. CEMS must be operated at all times hazardous waste is fed into or remains in the combustion chamber (61 FR 1.7379). DOE points out that the requirement for a CEMS to be operating "at all times hazardous waste is fed" will result in the need for facilities to shut down whenever the CEMS is not operating. DOE believes that it is very onerous to require a facility to shut down every time a CEMS is down without consideration for the reliability of the CEMS. Estimated availability (operation time per year) for mixed waste units is already much lower at typically 5,000 hours or less (around 50% availability) than typical hazardous waste incinerators (which are at around 90 % availability), due to operating and maintenance issues related to the radiological containment. DOE feels that to impose added risk of shutdown from inadequately demonstrated and difficult to operate CEMS (that may be unrefiable) is not reasonable. DOE suggests that a more reasonable requirement would be for EPA to allow facilities to assess the up-time of the CEMS and then calculate some percentage of down time from there.

Comment Summary to Issue 3

Commenters state that EPA's insistence that CEMS be operating whenever hazardous waste is in the unit was impractical. Instead, EPA should establish a minimum data availability and give alternatives (resumption of operating parameter and feedstream monitoring) so a facility could keep operating even if a CEMS fails. Other include:

- Through redundancy, CO, HC, and O_2 CEMS can have a 100% data availability requirement;
- Measurement must be made at 15 second intervals;
- Data availability for new CEMS should be phased in, that is, a lower data availability should apply in the early years;
- 100% data availability is inconsistent with Part 60, Appendix F; and
- Data availability typically ranges from 75 to 90%.

Response to Issue 3

EPA agrees that new CEMS should have a data availability criteria, typically in the range of 75 to 90%. (Data availability less than 75% tends to indicate inadequate performance.) EPA also agrees that a resumption of operating parameter limits and feedstream monitoring should occur when a CEMS is down so "100% compliance coverage" for a standard can occur. Feedstream and operating parameter requirements would result from modeling of emissions measured by the CEMS. This would eliminate the need for performance testing for standards complied with using a CEMS in later years.

However, CO, HC, and O_2 CEMS have shown the ability to have little downtime (in part through the use of redundant monitors) so these CEMS must be properly operating whenever waste is in the unit.

EPA agrees that making measurements at 15 second intervals is inconsistent with what occurs in other Office of Air rules. However, it is consistent with standard practices for this industry since the BIF and incinerator rules require such frequent monitoring. For simplicity, we believe it is better to maintain the 15 second requirement rather than impose different requirements at the same source.

EPA recognizes the concern that facilities might need a lower data availability requirement in the early years of operating a CEMS. EPA will consider this in the future if new CEMS are required.

EPA stated in the preamble that it intended to supercede Part 60, Appendix F with the Appendix to Subpart EEE. See page 17441 of the preamble to the proposed rule and section 6 of this volume of the response to comments document for a more complete explanation.

4. Incentives for Using CEMS

Comment

CEM1.003(097) H. If EPA is committed to development and use of CEMS, then EPA should consider a program whereby industry is offered incentives to use CEMs for data collection, such as reduced compliance testing or monitoring redundancies.

CEM1.007(101)(a) The implication that CEMs must be on-line 100% of the time is a significant disincentive to the use of CEMS;

CEM1.018(114) CRWI also recommends that incentives be provided for CEMs use through extending schedules when CEMs are installed, developing alternative limits based on CEM usage, and reduced scope of testing for CEM related parameters. CRWI believes that individual permit writer should be allowed to take into account site- specific needs while giving incentives to install and operate CEMS. This would reward facilities that install CEMs with fewer testing requirements, but not penalize them with increased down time.

CEM1.029(127)(a) Continuous Emissions Monitoring Systems (CEMS)--The proposed application of CEMS to HWCs should be modified to.... Specify development of an uncertainty factor (or error band) to determine the measured site-specific value (emission standard plus uncertainty) which constitutes an exceedance of the emission standard.

CEM1.029(127)(b) However, certain key aspects of the European manner of applying CEMS to HWCs, developed from real-world experience concerning the performance capabilities and limitations of commercially-available instruments, have not been addressed in the proposed rule. Specifically, the following provisions affecting the practicality of continuous monitoring of PM emissions per the European model should be incorporated into any CEMS requirement within the final rule:

- development of an uncertainty factor during calibration which is used to determine the actual measured site-specific value which constitutes an exceedance of the emission standard (i.e., emission standard plus uncertainty or error band).

CEM1.029(127)(c) Note that these requirements make allowance for uncertainty in the real-time accuracy of the continuous monitor.

CEM1.035(129)(b) To encourage the use of CEMS, it is suggested that EPA relax the requirement that whenever the CEM goes offline (either due to operational problems or calibration problems), hazardous waste feed cease. To turn this disincentive into an incentive, it is suggested that EPA establish an expected practical, operational downtime for each CEM system (this must include the whole system, not just the analyzer). As CEM systems become more reliable, the percentage downtime allowed should be decreased. To avoid excessively long downtimes, a limit to length of time a unit can operate without a CEM should be established. An approach to gaining this reliability could be a CEM certification process similar to TUV certification used in Germany. Certified instruments in Germany require greater than 90 % data availability. There are ample precedents for this in other MACT rules. In fact, certain sections of the General Provisions (63.8) that were specifically excluded from this proposed rule allow exactly what is being proposed.

The above plan would allow the individual permit writer to take into account site specific needs while giving incentives to install and operate CEMs. This would reward facilities that install CEMs with fewer testing requirements, but not penalize them with increased downtime.

CEM1.037(129) In order to encourage the use of CEMS:

1. Establish pollutant specific data collection needs in a Quality Assurance Plan Guidance Document.
2. Allow the concept of data availability to be incorporated into the Quality Assurance Plan for the specific unit
3. Base the data availability on actual availability established over some specified period of time while initially using the CEM. (Similar to suitability testing under the German Certification by TUV)
4. Establish a "trial period" (like German suitability test period) during which the CEM is being developed on an experimental basis at the unit.
5. During this "trial period" establish the final quality objectives for the CEM
6. During the trial period and as a backup when required, use alternate means for demonstration of compliance with the emission standard
7. Incorporate "uncertainty" into allowable maximum CEM measured emission limits for each parameter over each averaging time.

CEM1.044(143)(b) In addition, the investigation of corrective action and reporting requirement associated with the AWFCOs connected to the EMs is likely to require an additional employee for the first one or two years of operation until these new systems have been debugged.

CEM1.053(145) If EPA wants to encourage facilities to use innovative monitoring methods such as undemonstrated CEMS, they should provide facilities with incentives to use the new technology. In the recently proposed Prevention of Significant Deterioration and Nonattairunent New Source Review (40 CFR Parts 51 and 52, (61 FR 38249)), EPA's Office of Air Quality Standards and Planning (OAQPS) provides sources with a provision that allows the use of innovative control technologies. EPA Office of Solid Waste should consider such a provision in the Hazardous Waste

Combustion MACT for the use of innovative monitoring technology.

In the Primary Aluminum MACT standard, EPA recognized the under-development of CEMS and is allowing facilities the flexibility to chose whether or not to utilize this monitoring technology.

It is important to note, that sources must be provided with some type of incentive (longer compliance time, no or reduced enforcement, etc.) to try out a new technology. Without an incentive, facilities will not be willing to jeopardize compliance and EPA will not receive the information they want on new technology.

CEM1.073(181) Eastman believes that a better proposal would be to allow facilities to demonstrate compliance by either CEMS monitoring or through the use of feedrate/operating parameter controls, and to provide additional incentives to promote the installation of CEMS. EPA suggests that installation of CEMS will greatly reduce compliance burdens because facilities will be relieved of many of the operating parameter monitoring requirements. Eastman does not believe this will be the case. CEMS are not available for all emission parameters. So, even if an owner/operator installs mercury and particulate CEMS, it will still have to perform comprehensive monitoring of operating parameters and waste feed analysis to comply with emission standards for other parameters. Therefore, the facility's compliance burden has not been significantly reduced. Eastman believes that the Agency and regulated community will be better served by enhancing the development of CEMS through incentive programs. Eastman believes that many facilities will be willing to install and evaluate CEMS if there are adequate incentives to make this option more attractive than the traditional operating parameter compliance option. Eastman believes that CEMS will prove to be advantageous and widely adopted by the regulated community once they are proven to be accurate, reliable, maintainable, and cost effective. Allowance of both the operating parameter and CEMS compliance options, with additional incentives for the use of CEMS, provides for a reasonable, orderly transition to the acceptance and use of CEMS. Eastman urges the Agency to work with the regulated community to identify those incentives that could provide a driving force for the development of CEMS.

CEM4.011(129)(a) If a facility already has chlorine restrictions, there is very little incentive to use a HCl/chlorine CEM at this time.

CEM5.029(125) At a minimum, a requirement that PM CEMS data be used for compliance would need to be accompanied by a provision that in effect raises the emission limit by at least 35% to account for the inaccuracy inherent in PM CEMS. <u>Compare</u> Reference Method 9 in 40 C.F.R. Part 60,. Appendix A (providing that the inaccuracy of the method must be taken into account when determining possible violations of applicable opacity standards). Without such a provision, there is a significant chance that sources would be declared in violation of the PM standard, when in fact they would not be in violation if a Method 5 test were performed. [Footnote 9 UARG acknowledges that the opposite is true as well. That is, a source could be well over the PM standard, when the PM CEMS was indicating compliance. UARG questions why EPA is not concerned about the substantial inaccuracy of the PM CEMS that could allow non-compliance to go undetected.] Such a situation is unacceptable and should not be endorsed by EPA through promulgation of PS 11 and the PM CEMS compliance method rule.

CEM9.003(114) German Experience As stated in Chapter 2, Volume IV of EPA's Technical Support Documents to the MACT Rule: "The German approach to the use of CEMs for compliance monitoring is based on the application of practical engineering philosophy. CEMs are employed, despite the known sensitivities to various factors such as particle composition and size distribution, within the statistical limitations determined by a site specific calibration procedure that defines the statistical relationship between CEM's response and PM loading. The reliability of the CEMs and the statistical relationships are assured as best as possible through performance based CEM's specifications and suitability testing and other long term tests run on plants at normal operating conditions using both CEMs and manual methods. This allows the development of confidence in the utility of the CEMs."

Table 2-4 of the above referenced document compares German regulation for PM CEMs with the proposed EPA regulation. This comparison shows the approach by EPA has not incorporated the concept of data availability (none by EPA vs. >90% by the Germans). Comparison of the EPA proposed QA also illustrates the proposed requirement by EPA for more frequent instrument response checks (Absolute Calibration Audits)(quarterly vs. yearly) and calibration checks (Relative Calibration Audits) (Every 18 months vs. 5 years).

Similar review of the preamble to the MACT Rule Part Five, II, C,7 indicates a willingness by the EPA to accept much of the German approach to using CEMS. However, EPA's approach does not apply some of the key factors that are part of the German's "application of a practical engineering philosophy" including:

- TUV equivalent certification (laboratory + on-site "trial period" for suitability testing);
- A combustion unit-specific maintenance interval; Data availability of >90%;
- A more reasonable frequency of calibration (3.- 5 years);
- A more reasonable measure of valid data (minimum of 20 minutes per half-hour averaging period); and
- Development of an uncertainty factor during calibration which is used to determine the actual measured site-specific value which is an exceedence of the standard (emission limit + uncertainty).

Potential Solutions

In order to encourage the use of CEMs, CRWI suggests that EPA:

1. Apply more of the "German Approach" as described in the above bullet points;
2. Base the frequency of collection of information on the pollutant-specific needs. The need for short-term (e.g., 15- second) CO response may be far more valuable in the control of process emissions than short-term particulate or metal-emissions information;
3. Incorporate the concept of data availability for all CEMS; and
4. Allow the use of process parameters to measure compliance assurance when the CEMs is not operational (e.g., APC parameters when CEM for particulate is off- specification).

Specific steps to accomplish the above suggestions are:

1. Establish pollutant-specific data collection needs in a Quality Assurance Plan Guidance Document;
2. Allow the concept of data availability to be incorporated into the Quality Assurance Plan for the specific unit;
3. Base the data availability on actual availability established over some specified period of time while initially using the CEM. (Similar to suitability testing under the German Certification by TUV);
4. Establish a “trial period” (Like German Suitability Test Period) during which the CEM is being developed on an experimental basis at the unit;
5. During this trial period establish the final quality objectives for the CEM;
6. During the trial period, and as a back up when required, use alternative means for demonstration of compliance with the emission standard; and
7. Incorporate “uncertainty” into allowable maximum CEM measured emission limits for each parameter over each averaging time.

CRWI recommends that if reliable continuous emission monitors are developed that will work in the wide variety of applications for a wide range of facilities, it is felt that the requirements should be stated as: The owner or operator shall install, calibrate, maintain, and continuously operate a CEM for carbon monoxide and oxygen, and have the option to install, calibrate maintain, and continuously operate a CEM for hydrocarbons, chlorine and HCl, particulate matter, mercury, and/or multi-metals. Oxygen and carbon monoxide monitors must always be operational except for the twenty minutes per day allocated for zero and span calibrations. All other instruments must be diligently maintained and cannot be off line for a period of greater than a specified percentage of the operating time of the facility as dictated by that facility’s permit. The specific on-line time is based upon the up-time demonstrated using the “trial period.” If the CEMs fail to meet on-line requirements, operational limits as determined by the permit will be in effect.

CEM2.NOD.009(229)(c) To encourage the development of CEMS, EPA should provide incentives that will make it attractive for owner/operators to choose to install CEMS.

CS3A-014 (1) 3. The accuracy and precision of the instrument must be considered when determining the definition of compliance. EPA's proposal to shutdown a combustion unit when the PM reading is above the standard is not acceptable when using an instrument that does not adequately reproduce the actual PM emissions. Because a significant number of false high readings above the emissions standard will occur due to data scatter the definition of compliance must be loosened to allow for this percentage of false high readings. Otherwise HWCs will be forced to shut down just because of the scatter in the PM monitor readings.

RCSP-114 (1) QA procedures of Appendix F specify the minimum QA requirements necessary to control and assess the quality of CEM's data used for demonstration of compliance. This appendix defines "out-of-control period" with respect to daily calibration and quarterly audits. There is also reference to minimum daily data requirement which has been used commonly by the power industry. This concept has also been applied to Municipal Waste Combustors (MWC). An example of minimum daily data requirement from 40 CFR 60.47a (applicable to Electric Utility Steam Generating Units) as it applies to continuous emission monitoring for sulfur dioxide is that the owner shall obtain emission data for at least 18 hours, in at least 22 out of 30 successive boiler operating days. The proposed rule is more stringent, specifically supersedes Appendix F with Appendix to Subpart EEE applicable to hazardous waste burning devices only. The only downtime of the CEM allowed is downtime due to calibration (20 minutes while calibrating a CEM).

In September 1990, guidelines were prepared for the Northeast States for Coordinated Air Use Management (NESCAUM) under a USEPA contract. NESCAUM recommended that states adopt regulations which require the use of CEM's to determine compliance with emission standards on a continuous basis at MWC facilities. The recommendation were:

- Establish initial certification procedures and requirements for CEM'S;
- Define quality assurance (QA) procedures and criteria for the ongoing determination of the acceptability of the CEM's and the monitoring data; and
- Specify minimum data capture requirements.

RCSP-128 (1)(b) Such reported CEMS performance problems and maintenance requirements could result in frequent, unplanned PM CEMS down-time. As discussed further below in section IV.C, depending on the frequency and duration of such shutdowns, CMA member companies that rely on on-site incinerators to dispose of hazardous wastes could face capacity shortages and operational problems, as EPA has proposed to require that hazardous waste combustors immediately cease burning hazardous wastes whenever "a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications." 17441. It is simply unacceptable for EPA to subject hazardous waste combustors to such a draconian requirement when the Agency itself recognizes that the compliance technology that it would force industry to install and operate has not been adequately demonstrated and is potentially unreliable.

RCSP-129 (2) Specific issues of concern include:

...

2. The rules indicate that all waste feeds must be discontinued when the PM CEMs is inoperable. It is understood that similar sources in Germany are not subject to this requirement and we believe that this requirement will substantially limit process operations. EPA should further evaluate the practical use of PM CEMs in operating facilities to better determine operating practices. CEMs uptime requirements should be consistent with actual operating experience.

...

Possible Solutions

...

2. The run time requirements for PM CEMs should be consistent with the established monitor performance and operating experience. Most State permitting agencies have recognized that there is significant downtime associated with the operation of CMS/CEMS. Many State agencies require permitted sources to track CMS/CEMs run time and to submit them monthly or quarterly. Enforcement action is only taken in the event of excessive monitor downtime or if the operator has been negligent in instrument maintenance.

<u>Comment Summary</u>

Commenters stated that EPA should give incentives if we want facilities to encourage the use of optional CEMS. Without incentives, CEMS represent an added burden to the facility making it unlikely that CEMS would be used.

Response

Response to these comments can be found in Part 5, section VII.C.5.c of the preamble to the final rule.

5. Monitoring Hierarchy

Comment

CEM1.006(101)(b) R-P is in agreement with the monitoring hierarchy proposed by EPA (17417/3). We also agree that, when CEMs are commercially available and proven reliable, CEM systems should be used to continuously monitor the HAPs of concern.

CEM1.016(114)(c) CRWI believes that the application of CEMs should be required based first on the need for the data and second on availability of the technology to reliably provide that data.

CEM1.054(147)(a) PART5: CEMS & OTHER MONITORING ISSUES I. Requirement to use CEMS EPA has failed to justify why continuous emission monitoring is necessary to ensure compliance with the proposed emission limits and operating parameters. Cement kiln operating parameters are very numerous and relate directly to the relevant factors for determining emission rates. Nowhere does the Clean Air Act require the use of CEMS, and such a proposal needlessly increases the cost of implementing the standards. An alternative based upon existing reasonable operating limits is clearly a better measure of kiln emissions. Continuous monitors -- many of which have not been proven reliable -- do not comport with recent EPA statements evidencing a preference for “credible evidence” of compliance. Reliance on traditional, proven tests, such as those prescribed under the BIF rules, is both preferable from a cost perspective and scientifically defensible.

CEM1.054(147)(c) Further, EPA misinterprets § 114(a)(3) by assuming that sources “subject to regulation as major sources” require enhanced monitoring. As stated elsewhere, most cement kilns are likely not major emitters for HCl/Cl_2 and D/F. Section 114(a)(3) mandates enhanced monitoring and compliance certifications only for owners and operators “of a major stationary source.” That is clearly not the same and EPA misses “the mark.” Continental also notes that Congress did intend EPA to consider indirect methods in situations where “direct monitoring of emissions is impractical” §114(a)(1)(E). Cement Kilns are just such a situation.

CEM1.088(208) The proposed rule language describes using CEMS or surrogate CEMS for demonstrating compliance with the emission standards. For those standards that compliance will be demonstrated through use of such CEMS, the issue of different modes is irrelevant. The CEMS will operate and demonstrate compliance regardless of operation of the combustion device.

CEM2.009(101)(c) II. Selection of Proposed Monitoring Requirements A. Monitoring Hierarchy R-P is in agreement with the monitoring hierarchy proposed by EPA (17417/3). We also agree that, when CEMs are commercially available and proven reliable, CEM systems should be used to continuously monitor the HAPs of concern. However, many of the CEMs discussed in the proposed rule are not available at this time, are not proven reliable and capable of providing data on an ongoing basis for extended period of times, or may be unsuitable to a particular facility's operating environment. Examples of problematic or undeveloped CEMs include those for mercury, metals, HCl and PM. Until these CEMs are perfected, the feedstream and operating limits are reliable controls if these are properly correlated with stack emissions performance testing and trial bums.

CEM3.002(101)(b) II. Selection of Proposed Monitoring Requirements A. Monitoring Hierarchy R-P is in agreement with the monitoring hierarchy proposed by EPA (17417/3). We also agree that, when CEMs are commercially available and proven reliable, CEM systems should be used to continuously monitor the HAPs of concern.

CS3A-004 (4)(b) Second, the Agency should work with the combustion industry in an effort that would allow units to voluntarily install such systems. To encourage voluntary installation of CEM'S, CRWI suggests EPA provide incentives in the rule for facilities to install this equipment. Some possible incentives are: * Reduce testing for any parameter measured by a CEM to the calibration and maintenance of that calibration; * Remove appropriate process parameter permit limits that are linked to the pollutant measured by the CEM; * Minimize regulatory oversight on waste analysis if compliance is consistently demonstrated by a CEM; * Use only national PM standard limit for all parameters measured by a CEM (no site-specific limit); * Increase averaging time for compliance limit; * Increase emission limits with use of the CEM to include uncertainty of CEM; *Allow a phase-in period where a facility can evaluate CEM performance and develop maintenance practices - during this phase-in period, the CEM would not be used for compliance; * Allow a phase-in period to establish the appropriate on-line time for that CEM at a particular location; and * Allow facilities to evaluate CEM's on a trial basis to determine if these instruments are appropriate for their operations with no penalties if the units do not work or have excessive downtimes. In doing so, industry and EPA would gain the real life experience necessary to evaluate the true state-of-the-art of this technology.

<u>Comment Summary</u>

Commenters disagreed on our approach to analyzing a hierarchy of options to determine what compliance methodology to use. Other concerns include:

- Both agreement and disagreement with EPA's approach;
- Confusion over section 114(a)(3) of the Clean Air Act; and
- Confusion over what is a CEMS and what is CEMS for a surrogate parameter.

<u>Response</u>

EPA maintains its reliance on analyzing a hierarchy of options to determine the best compliance option for standards. See the section entitled "Monitoring Hierarchy" found in Volume II of this Response to Comments document for more information on this.

Section 144(a)(3) allows EPA to prescribe “the method used for determining compliance”. CEMS are a method for determining compliance so requiring CEMS is consistent with 114(a)(3).

Finally with regard to what is a CEMS or surrogate CEMS, a CEMS measures some constituent of stack gas. The constituent measured could be what is defined in the standard, say particulate matter as measured by Method 5, or a surrogate for that standard, such as opacity is a surrogate for particulate matter.

6. Transitioning from Compliance based on Performance Testing to CEMS

Comment

CEM1.008(105) Laidlaw is concerned, however, over how a facility will make the transition from compliance based on feedstream and operating limits to compliance based on CEM systems once these systems are commercially available. Will a facility be required to conduct a performance test to establish CEM-based limits whenever a new CEM is installed or will a gradual phase in of the CEM be allowed? Without clarification of this issue, we are concerned that a facility may be forced to comply with both CEM and feedrate/operational limits. We cannot support this position. Further, if the facility’s operational permit is based on a feedstream or operating limit, will a permit modification be required to switch to a CEM- based limit and what level of permit modification would this be? Finally, could the RCRA Omnibus Authority be used by a State or the Agency to block the installation of CEMs based on a perception that a feedrate or operational limit is more restrictive than a CEM limit?

EPA should include provision in the final rule dealing with this monitoring transition issue. Laidlaw recommends that a limited performance test be required whenever a facility wishes to change from a feedrate or operating limit to a CEM based limit. The test should be limited only to those parameters affected by the change. In order to expedite the installation of CEMs the change should be considered a Class 1 or Class 1 with prior approval. This approach is consistent with the Agency’s goal of implementing a streamlined procedural framework that allows facilities to make necessary changes to permits while still allowing form a satisfactory level of public input.

CEM1.012(111)(b) The EPA should have a procedure to phase in CEM usage whenever they become adequately developed and commercially available.

CEM1.034(129)(b) If a facility chooses not to install CEMS, that facility should be required to perform an initial comprehensive performance test. Appropriate operating parameters will be reported and used to establish compliance. Should a facility choose to install one or more CEMS, the facility would be required to perform an initial comprehensive performance test to establish operating parameters but would not be required to repeat the test for those parameters covered by the CEMs the facility have until the permit comes up for renewal. The CEMs data would be used for demonstrating compliance, and operational parameter records would be maintained only as part of the operating record.

Comment Summary

Commenters raised several general concerns over how a facility would transition from using performance testing and operating parameter limits for compliance to an approach using CEMS. They specifically asked:

- Will a facility be required to conduct a performance test to establish CEMS-based limits whenever a new CEMS is installed or will a gradual phase in of the CEMS be allowed;

- Will a permit modification be required to switch to a CEMS-based limit and what level of permit modification would this be;

- Could the RCRA Omnibus Authority be used by a State or the Agency to block the installation of CEMS based on a perception that a feedrate or operational limit is more restrictive than a CEMS limit; and

- The suggestion that facilities be required to perform an initial comprehensive performance test to establish operating parameters but would not be required to repeat the test for those parameters covered by the CEMS the facility have until the permit comes up for renewal.

Response

EPA strongly believes that interaction between the permitting authority and the facility is absolutely required if a facility chooses to use a CEMS for compliance. A facility will need an understanding with the permitting authority over a shakedown, or "trial" period for the CEMS. It might need waivers of applicability for certain standards in order to correlate emissions to CEMS outputs. It will also have to negotiate the CEMS limit and averaging period with the permitting authority. All this would result in some eventual permit modification (if a permit exists) or at a minimum an understanding over how the CEMS data will be handled by both the facility and the permitting/enforcement authority. All this, including the level of permit modification, is best dealt with locally based on the specifics of the situation at hand.

EPA does not believe that in most cases Omnibus or other authorities would/could block the use of a CEMS if the CEMS is a reliable, accurate measure of emissions. However, EPA notes that the comment is general and specific aspects of a given situation may bring about a different result.

If a facility elects to use a CEMS for compliance, an initial performance test for standards complied with using a CEMS would more than likely be necessary. This is because a facility might not have adequate CEMS data to derive the operating and feedstream parameters necessary to ensure compliance during periods when the CEMS is unavailable. A facility might install the CEMS before the reporting date for the operating parameters, though, and base these operating and feedstream parameters on that data. In the later case, no performance test would be necessary.

7. Compliance Using a CEMS and Averaging Period Impacts of Stringentness of Standards

Comment

CEM1.010(108) 3. EPA, by requiring untested monitoring systems, is imposing even more stringent standards

EPA, in requiring continuous emission monitoring systems (CEMs), has effectively ignored the interrelationship between emission limitations, operating requirements tied to those emission limits, and the monitoring methods for ensuring compliance. All three of these elements interact in determining how a facility must operate to meet a MACT standard. An emission standard must be considered in the context of how the standard will be measured. The ultimate emission level is highly interrelated with testing protocols, monitoring methods, and testing frequency. As such, it is not necessarily the case that the same "best operating facilities" that were used to establish a MACT floor emission standard under one set of measurement methods could achieve that same standard using another measurement method.

It has long been recognized that emission limitations are closely related to averaging times and monitoring methods: "...a testing method which contains an averaging technique is fundamentally different from a testing method which aggregates unaveraged readings ... It is undisputed that the method of determining compliance with an emission standard can affect the level of performance required by the standard, even though the standard itself has not changed." Donner Hanna Coke Corporation v. Costle, 464 F.Supp. 1295, 1303, 1304 (W.D .) (N.Y. 1979). See also, United States v. Zimmer Paper Products, Inc - 1989 U.S. Dist. LEXIS 16586 (S.D.) (Ind.1989) (EPA's attempt to change compliance method for VOC emission limitations invalid, because EPA had not followed rulemaking procedure); PPG Industries v. Costle, 659 F.2d 1239 (D.C.Cir. 1981) (EPA needed to follow rulemaking procedure to change averaging time for determining compliance with SO_2 NAAQS); National Lime Association v. Environmental Protection Agency, 627 F.2d 416 (D.C.Cir. 1980)(contains detailed analysis and criticism of EPA evaluation of data in developing emission limitations contained in NSPS which was arguably not achievable).

EPA itself has recognized that data from CEMs may not be acceptable evidence to demonstrate that an emission standard which specifies some other compliance method has been violated. [Footnote 18: <u>See</u> Guidance: Enforcement Applications of Continuous Emission Monitoring System Data, from Edward R. Reich, Director, Stationary Source Compliance Division, (Apr. 22, 1996).] Nevertheless, EPA has proposed MACT floor emission limitations based on data compiled from a variety of different test methods and with a variety of different averaging times, and is proposing to require that compliance be demonstrated through CEMS, many of which have not been demonstrated. Even if EPA had demonstrated that emission limitations were achievable based on data obtained from compliance tests (and EPA has clearly not made such a demonstration, as described above), it does not follow that such emission limitations can be achieved if CEMs (or other test methods) are required. In effect, EPA has established BTF standards for all MACT pollutants where the monitoring requirements or operating requirements are not part the existing operating controls. This is the case for all pollutants requiring CEMS.

CEM1.011(109) Issue 1: The proposed MACT standards for hazardous waste combustors (HWC) are based on data collected from three test runs during which emissions were measured by manual sampling methods (except for hydrocarbons (HC) and carbon monoxide (CO)). To maintain equity for those facilities using continuous emission monitors, the proposed rule suggests that the averaging time(s) for continuous emission monitors (CEM) be based on the average of the sum of times required to complete the three manual method sampling test runs. For example, the proposed averaging time for the mercury CEM emission standard for light weight aggregate kilns is ten hours, that is, the sum of three 200 minute test runs (600 minutes), or ten hours.

Comment: As noted in the proposed rule, averaging periods are the time periods over which emissions or feed stream and operating parameters are set. These periods require consideration because of the inherent variability associated with normal industrial and process operations.

KDHE agrees that the averaging times for CEM monitoring should be based on the time required to complete the manual sampling methods. However, as explained below, there is an inconsistency in how the manual sampling data is being interpreted.

The data used to establish the MACT emission standards are primarily data that was generated from trial burns and certification of compliance testing required under the Resource Conservation and Recovery ACT (RCRA) Subtitle C hazardous waste program. This program requires that testing be conducted in triplicate. The trio of individual samples are not composited; each is collected independently and evaluated independently. Hence, each sample represents- the average emissions observed during each individual sampling test run.

Thus, to interpret the data correctly, the averaging times should be based on the length of time required to complete one sampling test run. In the example given above for mercury, the averaging time would be 200 minutes, not 3 x 200 minutes. The numerical value of the MACT emission standards would, of course, remain the same.

It is also worthy to note that long averaging times (3 hours and longer) will encourage poor waste management practices and policies, especially at off-site commercial facilities. The most obvious poor management practice will be to encourage feeding wastes containing high concentrations of a given pollutant over short durations (even perhaps feeding at higher rates than may be demonstrated during the comprehensive performance tests). Facilities may then reduce the feed rate of the pollutant and still be able to meet the long term rolling average emission standard. KDHE questions the validity of encouraging, these types of poor waste management practices.

CEM1.014(111) The solution is to make the CEMS averaging time longer, say 24 hours, if that is still protective to health and environment. For metals emissions, the health effects are chronic and long term emissions are sufficient to monitor the risks. It should be recognized that the proposed metals CEMS averaging times were arbitrarily based on the average manual sampling time for three tests to be used as the standard and had no relationship to the averaging times actually pertinent to exposure assessment.

CEM1.055(148) In addition, just because an emission rate compliance limit can be achieved under stack testing, this does not automatically conclude that CEMs will demonstrate compliance (e.g., HCl monitors) at the newly proposed averaging times.

CEM1.062(170)(a) (5) failing to account for the fact that the data upon which the floors and standards are based were measured using manual test methods, not the CEMS often prescribed in the proposal;

CEM1.062(170)(b) EPA IMPROPERLY USED DATA DERIVED FROM MANUAL TEST METHODS TO SET FLOOR LEVELS AND STANDARDS BASED ON CEMS COMPLIANCE

Among the serious flaws that EPA made in calculating the proposed floor levels in the proposal was its failure to recognize that emission limits with the same numerical number can differ drastically in terms of stringency if the monitoring methods and corresponding averaging times and testing frequency differ. CoC and other data that are based on manual test method s with relatively long averaging times and infrequent testing cannot be used to set floor levels and standards based on compliance with CEMs, unless those data are adjusted. Because EPA failed to adjust the data, and has proposed floor levels and standards with corresponding shorter averaging times and more frequent testing than those associated with the underlying data, the floor levels and standards are overly stringent.

An emission standard is not simply a numerical limit expressed on a mass or concentration basis. In addition to the numerical level, the stringency of an emission limit is affected by the associated monitoring or performance test conditions, the frequency of the testing, and the number and duration of runs — total sampling time — used to measure emissions an d determine compliance. As the U.S. Court of Appeals for the D.C. Circuit has held, "a significant difference between techniques used by the Agency in arriving at standards, and requirements presently prescribed for determining compliance with standards, raises serious questions about the validity of the standard." Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 396 (D.C. Cir. 1973), cert. denied, 417 U.S. 921 (1974). See also Bethlehem Steel Corp. v. Gorsuch, 742 F.2d 1028, 1034 (7th Cir. 1984) (EPA acted illegally in approving most of a SIP rule but disapproving part that allowed the limit t o be exceeded for 15 minutes every 24 hours, because by deleting this compliance provision EPA "stiffened the preexisting regulation"); Donner Hanna Coke Corp. v. Costle, 464 F. Supp. 1295, 1304 (W.D.N.Y. 1979) ("It is undisputed that the method of determining compliance with an emission standard can affect the level of performance required by the standard, even though the standard itself has not changed").

Thus, when gathering data to determine the "best performing" source or sources in category, it is essential to make note of these test methods, testing frequency, and sample size (duration) and number of runs averaged (which we will refer to collectively as "testing parameters"). Moreover, the floor and standards must have consistent testing parameters to ensure that the floor levels could actually be achieved by these sources. If EPA wished to adjust these testing parameters, it would have to make corresponding adjustments in the numerical floor and standard.

These points are discussed in greater detail in Appendix C and in a March 9, 1995 paper by Robert L. Ajax (former head of the Standards Development Branch in EPA's Office of Air Quality Planning and Standards, Attachment 4) on "The Effect of Compliance Test Frequency on the Stringency of Technology Based Standards" and two peer reviewed papers by H. Gregor Rigo, "Selecting Statistically Meaningful Emission Rates" (1993) and "Estimating Stack Gas Emission Rates" (1992) (Attachments 5 & 6). In brief, however, the shorter the averaging time, the more stringent the standard. This is because emissions from a source vary, and longer averaging times "dampen" the effect of this variability. Thus, the emission limit can be set close to the average emission level of a source, with reasonable confidence that the limit can be met.

As the averaging time decreases, however, the probability that the emission limit can be met also decreases. For example, a source with an average emission level of 4.0 will emit at a higher rate than that half the time and at a lower rate half the time. If compliance were measured on a 30-day average basis, the variations in emissions will be dampened more than if compliance were measured on a daily basis; in other words, the number of times that the 4.0 level is exceeded will be greater under the daily averaging period. See Attachment 4 at p. 12.

An analogy to a car traveling on a road with a 55 mph speed limit helps explain this concept. Assume that the car is averaging 52 miles per hour, but that its instantaneous speed varies between 45 and 60 mph. The car would never exceed the speed limit if the limit were written with an hourly averaging time, since 52 is less than 55; the averaging time would help to dampen the variations in speed. But if the limit were written using a 15-second or instantaneous averaging period (radar guns measure on close to an instantaneous basis), there would be exceedances. The car certainly would have to be traveling over 55 mph for many instants, and probably would be averaging over 55 mph for a number of 15 second periods.

Similarly, frequency of testing affects the stringency of a standard. For example, if a state trooper clocked the speed of the car only once every few hours, the probability of a finding of violation would be much lower than if he clocked the speed every ten minutes. For a discussion of the effect of frequency of testing on stringency in the air pollutant standard context, see Attachment 4 at pp. 5 and 8, and 13-14, and Tables 2 and 3.

EPA, however, completely failed to adjust for the fact that CoC and other data are based upon manual test methods with longer averaging times (number of runs multiplied by the duration of each run in average) and much less frequent testing than the continuous monitoring that EPA has proposed in this rulemaking. (TSD, Vol. IX, Chapter 5) This is a fatal flaw. It makes the floor levels and standards far more stringent than would be the case if the standards were written to reflect the averaging times and testing frequency of the underlying data upon which the rule is based.

CEM1.062(170)(c) E. CKRC OBJECTS TO EPA'S FAILURE TO PROPERLY CONSIDER THE CEMS RELATIONSHIP OF CEMS TO MANUAL METHOD LIMITATIONS

CKRC is especially concerned that the Agency has not recognized the hidden ratcheting effect of substituting CEMs for Manual method compliance demonstration without making statistically necessary adjustments to compliance frequency and overall process variability characteristics. Absent these adjustments, emissions limitations become much more stringent . EPA states that "CEMS emission limit would be equal in stringency to the manual stack test limit if they both had the same numerical value and the CEMs averaging period were equal to the sampling period for the manual method." (61 FR 17397). This is not true. Manual method tests are done periodically and CEMs, as the name implies, measure continuously. To be equal, the Agency must recognize that the number of compliance periods to be contained increases substantially. For an annual 3-run, 2 hour sample particulate compliance is demonstrated over 6 hr/yr. With a CEMs, compliance must be demonstrated 1,460 times per year. To accommodate this shift, the traditional statistical significance level (0.05 or 9 5% confidence level) relating the emissions limit to the average via multiples of the standard deviation must be increased to 0.000034 (99.9966% confidence level). Absent this adjustment the likelihood of noncompliance from a plant operated as it would be to pass a manual method test increases from on failure every 20 years to 73 failures a year.

Statistical characteristics affect the conversion from manual methods to CEMs limitations.

It is very important that whatever averaging time is finally selected, the data used to establish the limit be expressed in consistent time units with the regulatory standard. For regulatory standards that are longer than the database measurements, the problem may be inconsequential; however, when multi-hour manual method results are used to calibrate standards for short term CEMS limits, the effect of averaging time must be recognized. Since shorter period data is more variable than longer-term data.

Consider for example a particulate CEMS operating on a low emitting source where five 2-hour method 5 runs are used to calibrate the monitor. The value at each of the three required test loadings is a 10 hour average. The variability about that point is characteristic of 2-hour test runs, so it is for 120 minute data. If the data were normally distributed [Footnote 230 EPA concluded in TSD Vol. III, Appendix B to Appendix C, that HWC particulates and metals are not normally distributed, but are adequately characterized by the lognormal distribution. So, a more refined analysis than this simple illustration of the problem is required.], the 10 minute standard deviation is 3.46 times larger than that measured during calibration. As discussed in Appendix C, an emissions limitation is correctly located a number of standard deviations above the average. For 15 runs, a 10 minute l imit is located about 7.4 standard deviations above the average rather than the 2.1 times indicated for 2-hr data. Using the EU standard as a guide (Appendix K), an acceptable particulate CEMS exhibits less than 30% relative standard deviation. For a facility with average emissions around 0.01 gr/dsft^3 @ 7% O_2, the Method Quantification Limit for Method 5, the standard deviation is about 0.003 gr/dsft^3 @ 7% O_2 and the 10 minute CEMS limit becomes 0.032 gr/dsft^3 @ 7% O_2.

The procedures to follow to make these adjustments are described in Appendix C. CKRC is concerned that present day particulate CEMS are not able to measure the emission levels EPA is trying to characterize under the best of circumstances. CKRC urges EPA to perform a proper regulatory development and properly account for differences in averaging time and compliance demonstration frequency.

Environmental Need For Short Averaging Time Cems Must Be Established

It is also important to realize that imposing short term emissions limitations has no measurable environmental benefit. CKRC believes that the need for short averaging times must be demonstrated by EPA. Our review of maximum measured emissions and site-specific dispersion indicates that no cement kiln has any potential to cause an adverse short-term (acute) environmental or health impact. A recent analysis done under the auspices of the ASME Research Committee on Industrial and Municipal Waste and published by AWMA demonstrates that all the metals permitted to be emitted in a few to thousand of years would have to be discharged in 30 minutes to approach OSHA's Immediately Dangerous to Health and Life limits[232]. Given these results, it is clear that there is no benefit to short averaging times.

EPA has stated that short term emissions could occur which would not made up for over the long-term. This is not technically or statistically a sensible argument. For example metals, the principal course of action is chronic (life-time) impacts. As long as the long-term average is not exceeded, there is no impact.

For dioxin, short term APCD temperature elevations will allow greater emissions, but the extent of a temperature exceedance and its duration are severely limited by the APCD ability to sustain heat. In any case, as long as the excursion is within the range described by the test data used to establish average emissions (design values), then highs will be offset by lows.

Given an apparent lack of adverse consequences under any conceivable upset and the fact that real facilities must operate well below the any emissions limitation most of the time if they are to meet limits when tested, there is no reason for very short averaging times.

CEM1.075(182) 3. CEM averaging times should be set at times no shorter than needed to assure proper feed management and protection of human health and the environment.

Dow specifically endorses the comments on CEMs prepared by CRWI. and adopts those by reference in these comments. CRWI recommended a one week limit for metals (to allow for semi-continuous monitors such as that used by 3M at its Cottage Grove, Minnesota rotary kiln), one week for PM (when such monitors become commercially available) and a 24 hour average for HCl and chlorine.

CEM1.082(202) CONTINUOUS EMISSION MONITOR SYSTEM Issue: The EPA should not set a PM CEM standard.

EPA is recommending establishing a PM CEM standard, yet it does not currently have monitoring information for PM utilizing CEM equipment. Currently EPA has only manual method stack emissions data for PM. (61 Fed. Reg. 17379). Since EPA does not possess CEM PM data, the Agency should not require the emissions data generated by such devices in a standard.

CEM1.NOD.001(147)(b) and (2) increase the underlying stringency of the rulemaking, thus further attenuating the cost-benefit calculations for any effort to go beyond the MACT floor for particular emissions.

<u>Comment Summary</u>

Commenters suggest that:

- A CEMS measurements are far more frequent than performance testing which increases the probability of finding a noncompliance;

- Risk modeling justifies longer averaging periods;

- Stringency of a standard is a function of both the numerical value of the standard and its averaging period;

- Concurrence with EPA's proposed approach to establishing CEMS-based averaging periods equal to three times the length of time necessary to run a single manual method sample train;

- Provided an analogy describing how our emissions standards are like speed limits; and

- Recommended that CEMS standards be established if a facility uses a CEMS for compliance.

Response

Responses to comments received here are discussed in "Averaging Periods for CEMS Standards" found in Volume II of this Response to Comments document. In summary, EPA found no persuasive arguments against and some support for our proposed approach, that CEMS averaging periods be established as the total testing time for which manual sampling methods would be used during compliance testing (i.e., total time to conduct three individual manual method test runs). (Note that this does not apply to CO or HC, which both have one-hour rolling average CEMS based limits).

Note that establishing a CEMS-based limit is likely required if a CEMS is required by EPA in a MACT rule. If facilities choose the option of using a CEMS, they would have to comply with the standard using an averaging period equal to three times the manual method sampling period, but this aspect of using CEMS is best evaluated by individual facilities when they make the choice of whether to use CEMS.

Risk is not a basis for establishing averaging periods for technology-based standards.

EPA agrees that if the measurement frequency increases, so does the probability of finding a noncompliance. EPA understands how facilities do not find this desirable, since they can have fewer controls and accept greater risk if compliance testing is less frequent. EPA on the other hand believes standards should be complied with at all times and facilities should install the equipment they need to ensure this and not accept risks.

EPA also agrees that the stringency of a standard is a function of its numerical limit and averaging period. See Appendices A and B of the support document for the 1991 MWC rule for more information. This document was cited on page 67796 of EPA's December 30, 1997, Notice of Data Availability.

Finally relative to the analogy concerning speed limits, EPA believes that if the commenter used that argument with a State Trooper ("Officer, my instantaneous speed might have been 60, but I averaged only 45 in this 55 mph zone") he would end his trip with about $70 less than he started it with.

8. CEMS Should be Optional

Comment

CEM1.012(111)(a) A summary of RES's position on the CEMs section of the MACT proposal is: 1. Development and demonstration of CEMs should continue. 2.MACT rules should be promulgated with the option of operating without the "new" CEMs such as PM, mercury, multimetals, HCl and chlorine which are not yet commercially developed.

CEM1.033(129)(e) The optional use of CEMs with the tradeoffs on other compliance procedures (e.g., feed restriction, compliance testing) is desirable as has been suggested in the MACT Rule in monitoring options for compliance demonstration of HCl and multimetals emissions.

CEM1.034(129)(a) Solutions Understanding the concern of both the regulators and the regulated community, the following plan in the final rule would create the flexibility pertaining to Hg, PM, HCl/chlorine, SVM or LVM CEMs while still addressing the needs of all parties. It is suggested that the final rule not require Hg, PM, HCl/chlorine, SVM or LVM CEMs to demonstrate compliance with the rule. However, some facilities will want to include these CEMs as soon as they are practically available.

CEM1.060(167)(a) BCP would also like to comment on the use of CEMS to demonstrate compliance. BCP believes that the EPA should not proceed with its considered option to require the use of parametric CEMs to continuously monitor for all constituents.

CEM1.060(167)(c) The CEMs option should be accompanied by the option of process control. This approach is especially appropriate for units with consistent feed streams and very low feed rates for certain constituents. Just as for the BIF Rule, facilities with minimal concentrations of constituents in the feed should be allowed to substitute feed monitoring and analysis similar to Tier I standards under the BIF Rule in place of emissions monitoring and control. Requiring emissions testing and parametric CEMs for facilities with certain constituent “emissions” which are under MACT standards on a feed rate basis would be redundant and extreme.

CEM1.087(205) TCC further suggests that sites be given flexibility to opt out of CEMs (such as low ash streams opting out of PM CEM), if a site can prove its waste stream is consistent - and provides little or no constituents of concern to be transformed into emissions. Also, sites with constituents of concern should be able to either select CEMs as an option, or to do periodic confirmatory testing (perhaps at a frequency more often than others with CEMS). We believe the permit writer at the state should be able to make the necessary determinations about the CEMS, AWFCOS, testing frequency, etc. based on the unit, its performance, compliance history, etc.

CEM2.009(b) Mercury and PM CEMs should be optional...

CEM2.038(145)(b) § 63.1210(a)(1) should be revised as follows: “Continuous emissions monitors (CEMS). (1) HWCs shall be equipped with CEMS for CO. HC, and O_2 for compliance monitoring. Owners and operators may elect to use CEMS for compliance monitoring for *Hg*, SVM, LVM, *PM*, HCl, and Cl_2.”

CEM2.038(145)(c) All operators should have the flexibility to select whether to use Hg and PM CEMS; they should not be made mandatory.

CEM2.041(153)(b) The use of a Hg CEM should be optional, however, because Hg CEMs are not readily available in the United States, are not widely used, have not been proven to be reliable, and to our knowledge, have not been demonstrated to meet the performance specifications described in

Part 60, Appendix B, Performance Specification 12.

CEM3.004(105)(a) 2.4 Metals 2.4.1 MM CEMS (p. 17429) Laidlaw supports the position of allowing the facility to choosing between utilizing MM CEMs or limits on operating parameters. This will provide the regulated community with needed operational flexibility.

CEM3.005(106)(b) ...but must allow operators the flexibility to choose between CEMs or operating parameter limits to ensure compliance with MACT emission limits (17427/2).

CEM3.014(130)(a) 4. Metals Generally, the ETC supports most of EPA's proposed controls for SVM and LVM (pages 17428-3 1). Our main concerns are with the lack of availability of MM CEMS, and support EPA keeping the option open to the operator to use CEMs or to comply with MACT by doing feed stream monitoring. With regard to operating parameters, we have concerns with certain fine points of EPA's control strategy as described below.

CEM3.020(153)(b) In the case of CEMs for SVMs and LVMs, however, CWM agrees with the Agency that the use of SVM and LVM CEMs remain optional based on the fact that these CEMs are not readily available in the United States, are not widely used, are not proven to be reliable and to our knowledge have not been demonstrated to meet the performance specifications described in Part 60, Appendix B, Performance Specification 10. The major concern of using newly developed instrumentation are reliability and accuracy. Due to the expense to purchase, install calibrate and maintain a CEM, spare units are not usually purchased, and as a result, if a unit is not reliable, it could cause unacceptable downtime on the incinerator. Another concern in that the performance specification requirements state that if the CEMs does not meet the requirements, it must be shutdown. Due to the fact that these instruments have not been proven to meet Performance Specification 10, significant downtime may be experienced due to this requirement. As a result, CWM agrees that these CEMs should remain optional.

CEM3.026(183)(a) 3M recommends that the rule provide for optional use of PM, Hg and other metals of concern, CEMs along with a method that gives incentives to install and maintain CEMs. This needs to include reduced waste feed analysis.

CEM3.027(191)(a) 82. Page 327 It is unacceptable for the Agency to propose an option allowing the use of a multi-metals CEM since no such instrument is currently available. There is no assurance, should one become available, that it would provide usable data.

CEM4.002(084)(b) The use of HCl and Cl, CEMS should not be mandatory; other options based on pH and operating parameters for scrubbers, baghouse and ESPs should be allowed.

CEM4.004(101) 6. HCl and Cl_2

R-P supports most of the provisions proposed by EPA for control of chlorine emissions (17432-35). We agree with EPA's conclusion not to mandate the use of CEMs for chlorine. We agree that facilities are likely to be required to monitor chlorine feed to demonstrate compliance with the LVM and SVM emissions standards anyway, given that a MM CEM may not be commercially available for some time. Furthermore, the removal efficiencies of control devices for HCl are well established, allowing feed controls to be highly reliable.

CEM4.008(124)(c) DOE suggests EPA consider making these [HCl and Cl_2] CEMS optional.

CEM4.011(129)(c) However, some facilities will want to include these CEMs [Hg, PM, HCl/chlorine, SVM or LVM] as soon as they are practically available.

CEM2.NOD.009(229)(b) As it has said in previous comments, Eastman believes that CEMS for PM and Hg should be optional. Facilities should be able to demonstrate compliance by either CEMS monitoring or through the use of feedrate/operating parameter controls.

CS3A-010 (1)(b) To demonstrate the CEM could be used for compliance with the PM standard, EPA is obligated to develop a method for converting reference method test requirements into an equivalent continuous emissions limitation. CKRC suggested several ways this could be done as part of its August 19, 1996 comments on the Proposed HWC Rule. CKRC requests that EPA evaluate alternative approaches and provide the public with an opportunity to comment on its findings.

CEM5.010(107) 2. The proposed monitoring methods creates a more stringent standard than the PM MACT floor. EPA is proposing to require cement kilns to determine compliance with the proposed PM MACT standard through continuous, directly-enforceable particulate monitoring systems (CPMS). This is not the same compliance method on which the cement kiln NSPS is based. Instead, the NSPS requires affected cement kilns to use continuous opacity monitoring systems (COMS) to measure opacity. 40 C.F.R. § 60.63. The COMS measures the refraction of light through the gas stream rather than directly measuring PM. In lieu of a COMS, cement kilns with certain air pollution control devices may use Method 9, a daily, visual method to measure opacity. Id. Moreover, opacity is not the same as PM, and COMS data are not directly enforceable under the NSPS. Instead, compliance with the NSPS opacity and particulate limits may only be determined by reference tests conducted under specified conditions (Method 5 for PM and Method 9 for opacity).

When EPA promulgated the cement kiln NSPS, EPA took the nature of the emissions monitoring methods, the frequency of the testing and the averaging period into consideration in establishing the numerical emissions limit for PM because of the inherent variability of the process, control technology and resulting emissions. These are key parameters affecting the stringency of a standard. A change in any of these parameters fundamentally changes the statistical probability that a source can meet the emissions standard by properly operating the pollution control equipment on which the standard was based. Increasing the frequency of monitoring and going from indirect to direct monitoring methods, as EPA proposes in the HWC MACT rule, substantially increases the probability that a source will be "out of compliance" during some monitoring period(s), even if it does everything the standard would otherwise require. See, e.g., Portland Cement Ass'n vs. Ruckelshaus, 486 F 2d 375 (D.C. Cir. 1973). To remain in compliance based on data gathered with a CPMS rather than other, less frequent, or manual methods, affected facilities may have to curtail operations or install additional pollution control technology.

Indeed, the Agency recognizes that a change in the frequency of monitoring can be a change to the standard itself. In a 1983 rule making regarding revisions to the Subpart D sulfur dioxide (SO_2) NSPS for steam generators, the Agency proposed to allow compliance to be demonstrated using a continuous emission monitoring system (CEMS). [48 Fed. Reg. 48960 (October 21, 1983).] When the Subpart D $S0_2$ NSPS was originally promulgated in 1971, compliance demonstrations were based on the use of EPA Reference Method 6, which requires a minimum three-hour test period. In the 1983 rule making, EPA recognized that, if compliance was measured through a CEMS, using a three-hour averaging time would significantly increase the stringency of the standard and, hence, compliance. Therefore, EPA proposed -- and did -- increase the standard's averaging time from three hours to 30 days to account for the normal statistical variability in emissions.

That same analysis has not been applied to the proposed PM standard for cement kilns under the HWC MACT proposal. The cement industry is particularly susceptible to the changes in monitoring requirements because of the multiple process factors that could affect emissions. See "Routine Particulate Emission Variability in Pyroprocessing Systems," Air Control Techniques, P.C. (June 7, 1996). (Attachment A). [See Copy of original comment RCSP-00107 at Docket for Attachments]. Even at the best-run sources with state-of-the art air pollution control equipment, inherent variations in the operation of the production equipment, in the performance of control equipment, and in the materials used in the process will affect PM emissions. Much of this variability is unpredictable, even when all inputs are held as constant as possible. In the proposed HWC MACT rule, EPA proposes to go from intermittent compliance monitoring to continuous compliance monitoring, without revising the numerical standard. It simply is not possible to change the manner in which compliance with a numeric emission standard is determined, without affecting the stringency of the emissions standard.

RCSP-125 (7) At a minimum, a requirement that PM CEMS data be used for compliance would need to be accompanied by a provision that in effect raises the emission limit by at least 35% to account for the inaccuracy inherent in PM CEMS. Compare Reference Method 9 in 40 C.F.R. Part 60,. Appendix A (providing that the inaccuracy of the method must be taken into account when determining possible violations of applicable opacity standards). Without such a provision, there is a significant chance that sources would be declared in violation of the PM standard, when in fact they would not be in violation if a Method 5 test were performed.[9] Such a situation is unacceptable and should not be endorsed by EPA through promulgation of PS 11 and the PM CEMS compliance method rule.

[Footnote 9 UARG acknowledges that the opposite is true as well. That is, a source could be well over the PM standard, when the PM CEMS was indicating compliance. UARG questions why EPA is not concerned about the substantial inaccuracy of the PM CEMS that could allow non-compliance to go undetected.]

Comment Summary

Commenters suggest that PM, Hg, MM, HCl, and Cl_2 CEMS should be optional, but not required. Subissues include:

- Some facilities may want to use these CEMS as soon as they are practically available;
- Facilities be given the option of "opting out" of PM CEMS if there is low ash in the feed;
- CEMS might not meet the proposed performance specifications; and

- It is unacceptable for EPA to propose an option for allowing the use of a device that does not exist.

Response

EPA agrees with commenters, that facilities should be given the flexibility to use CEMS in the future which EPA cannot require now. EPA often finds itself stuck in the proverbial "chicken and egg" situation, one where we cannot require CEMS because they are not being used, yet no facility will use them because the regulations do not allow CEMS to be used. We hope this approach will benefit both EPA and facilities.

EPA does not believe it should allow facilities to "opt out" of a PM CEMS requirement simply due to "low ash" content in the feed. Ash content is only one of many variables which bring about PM emissions. The adequacy of the control device, the presence of certain air pollution control equipment, such as carbon injection and certain acid gas scrubbing equipment also contribute to PM emissions. "Opting out" of PM CEMS does not seem desirable.

EPA agrees that the CEMS might not meet the proposed performance specifications. For this reason, EPA is not promulgating the proposed specifications. See section 8 issue 1 of this volume of the Response to Comments document for more discussion on this topic.

Finally, EPA does not understand why it should forbid the use of a technology simply because it is not available at the time of the rulemaking. As mentioned in the first paragraph of this response, rigid regulatory prescription regarding how facilities must comply with emissions standards has caused a reluctance to install innovative equipment. One need look no further than the Opacity monitor requirements found in the 1970's NSPS requirements of Part 60 for an example of how this approach can remove incentive to install innovative equipment, such as PM CEMS.

9. General Costs

Comment

CEM1.013(111) Quality Assurance and Control Procedures for CEMs Quality Assurance and Control procedures for CEMs have become commonplace to RES. Where the instruments in question are well supported by vendors, and in broad use, tying stack analyzers to the ability to burn waste is broadly accepted. It is this lack of background which makes the PM (and metals) analyzer(s) so difficult to accept. The HWI industry actually relies on the installation of redundant analyzers for key parameters, so that unit on-stream time is not impacted by instrument failure. If and as the new CEMs become institutionalized, a similar redundancy for them may be warranted. That cost should be factored into any assessment.

CEM1.016(114)(b) CRWI encourages the development of increasingly sophisticated emissions monitoring strategies for hazardous waste incinerators where such technology can cost- effectively reduce other technologies to judge performance.

CEM1.016(114)(g) Concern: There should be an appropriate cost benefit to CEM use as a compliance assurance tool. Suggestion: Users support the concept that EPA has presented if there is a cost savings over alternative measures of compliance. They support keeping options open for alternative compliance strategies. For some units (especially BIFs or incinerators with relatively few waste feed streams), CEMs do not provide appropriate cost/benefit. Increased tradeoffs in compliance testing frequency and operating parameter (CMS) limits are suggested as CEMs are applied for compliance assurance.

CEM1.023(118) D. EPA Should Establish Flexible Monitoring Requirements for the SMFPI Subcategory In establishing monitoring requirements, EPA must consider the cost-effectiveness of the monitoring by considering its actual contribution to emissions reductions. The apparent philosophy of the proposed standard is that CEMS are, by default, the assumed monitoring requirement. EPA must recognize the added costs of CEMS or any monitoring in light of any <u>emissions reductions</u> actually achieved.

Allied Signal believes that the EPA estimate of $130,000/yr for all required CEMS is considerably low. Based on a recent NOx CEMS installed at one of our plants, Allied Signal estimates the actual cost for single CEM to be:

Capital Recovery	$25,000
Maintenance	12,000
Performance Test	15,006
Lost Capacity[9]	32,000
Total Annual Cost	$84,000

[Footnote 9: Estimated cost of off-site waste disposal assuming 2% downtime due to CEMs.]

Total annual costs for installation of the 5 CEMS that are required by the proposed rule (CEM is required for CO, HC, PM, Metals, and HCl/Cl_2) would then be $420,000/yr. Allied Signal further believes that all costs (capital, maintenance and downtime) associated with the less proven CEMS (PM, Metals, and HCl/Cl_2) will be significantly higher and could exceed $500,000/yr.

It is important that the EPA recognize that CEMS (or any monitoring) may be extremely cost-ineffective in some applications since the effective use of CEM results in only minimal, if any, actual emission reduction. This is particularly true for those facilities that are in the SMFPI sub-category, where the low mass emission rates and the consistent nature of the waste feed streams and the ability to monitor the waste feed streams provide a way to implement a more cost-effective mechanism for demonstrating and assuring compliance.

Furthermore, EPA must consider the level of reliability that is associated with any CEM and must take into account all of the impacts that a failure of CEM will have on the incinerator capabilities and, for the SMFPI, the impact on the process. Interruptions of a process could, as explained above, result in the creation of additional wastes and additional emissions. Consistent interruptions of a process due to CEM failures could result in more severe measures. Production operations would either be grossly curtailed to match incineration “uptime” opportunities, or be forced to manage their wastes off-site. Transport and disposal of hazardous waste would be extremely unsafe and costly (approximately $2 million per year). Such disruption could ultimately force shutdown of process operations and result in loss of a beneficial commercial chemical product line. Given that there are valid alternatives to continuous monitoring for a SMFPI, the final rule should adopt the alternatives to CEMS that Allied Signal is suggesting below.

CEM1.025(124) 4. The Department [of Energy] will also encounter significant additional costs that far exceed the costs typically incurred by incinerators that burn solely hazardous waste when complying with test burn and compliance monitoring requirements. For example, testing equipment once used will be radioactively contaminated and have to be replaced or handled as contaminated material. Some CEMS (e.g., Hg, multi-metals), whose performance in a radionuclide environment is questionable (at best) or unknown, may require slight modifications (e.g., replace a faulty probe, or sensing surface) by the manufacturer or manufacturer's representative. Equipment manufacturers and their representatives are not equipped to deal with radioactively contaminated monitoring equipment. Most likely, DOE will end up purchasing replacements for radioactivity contaminated equipment, unless the equipment can be decontaminated to remove the radioactive contamination.

CEM1.026(124) If EPA is envisioning requiring redundant CEMS to support up time, then DOE requests that EPA justify the cost of redundancy through the Office of Management and Budget.

CEM1.033(129)(c) Concern: There should be an appropriate cost/benefit to CEM use as a compliance assurance tool.

Suggestion: Users support the concept the EPA has presented if there is a cost savings over alternative measures of compliance. They support keeping options open for alternative compliance strategies. For some units, (especially BIFs or incinerators with relatively few waste feed streams) CEMs do not provide appropriate cost/benefit. Increased tradeoffs in compliance testing frequency and operating parameter (CMS) limits are suggested as CEMs are applied for compliance assurance.

CEM1.041(139)(a) The current draft version of Hazardous Waste Incineration MACT requires up to five different analyzers monitoring for different waste constituents. Estimates of CEMS reliability, based upon field experience, range between 75 and 90 percent. This translates into a potential lost operating time for our on-site hazardous waste incinerator of up to 2,190 hours per year. The cost for off-site incineration of wastes, including transportation, for 2,190 hours of downtime is estimated at $3.5 million annually! These costs, due to lost operating time due to CEMS malfunction alone, are unacceptable.

To deal with these costs, CEMS operators have installed redundant analyzers, and in some cases, redundant CEMS systems, doubling the cost of emission monitoring systems. The costs associated with redundant CEMS systems approach seven figures. These costs are also unacceptable and cannot be justified. With the increased cost of operating commercial and on-site incinerators due to monitoring and enhanced performance testing requirements, the cost of off-site incineration could easily be expected to double. In the proposed rule, CEMS failures would result in waste feed interruption due to interlocking with the AWFCO system which would increase % emissions due to interrupted operation. No alternatives are allowed. This approach is not realistic.

CEM1.044(143)(a) The addition of so many additional CEMs will virtually require the assignment of at least one additional instrument technician full-time to test and maintain these CEMs.

CEM1.046(143) It can also be expected that these calibration gases will become very expensive once 40+ facilities begin purchasing them on a regular basis.

CEM1.049(143) 1.0 Particulate Monitors There are a number of different technologies. Some of these may prove to be unsuitable for the purpose, however. At the present time, there is insufficient data to indicate which technologies will or will not work. The systems range from approximately $25,000 to $57,000. This includes installation as well as recommended spares and training of the instrument technicians.

The data from this instrument would need to be sent to a data manager (computer with software) to compute and compare the rolling averages to the operating limits. This data manager would store data, print reports, initiate alarms and AWFCOs as required.

2.0 Mercury Monitor

There are some differences in the technologies used by various vendors. Currently, the available data does not indicate that any of the vendors have a monitor that meets the performance specification. It is estimated that the cost to install a monitor that has proven reliable in service in Europe would be around $113,000. This includes shipping and customs fees, installation and training of facility technicians.

As with the particulate monitor, the electronic data from this instrument will need to go to a data manager for rolling average computation and a comparison to operating limits values. If the current data manager operated by the facility is unable to handle these tasks, an estimated $10,000 would probably be needed for the computer hardware and software to perform this task.

These cost estimates do not include enclosures or services (such as electrical or air conditioning, etc.)

3.0 CEM Operating Cost

The maintenance of the particulate and mercury CEMs is an additional burden of this proposed regulation. These costs include replacement parts and calibration chemicals, and daily periodic maintenance by a properly trained technician. Generally, annual cost for parts and chemicals are estimated at 10% of the capital expense. The wages and benefits for a technician at a cement facility are estimated at $50,000 per year. Consequently, the annual cost to maintain particulate and mercury CEMS is expected to be $67,000 per year. There is no way to estimate the cost of lost revenues due to a malfunctioning CEM. In addition to these routine maintenance costs, there will most probably be substantial costs during the first year of operation for charges to cover the vendor's technicians' time and travel for system debugging not covered by the warranty. These changes were substantial for the first year for the total hydrocarbon and carbon monoxide monitors required under BIF.

4.0 Other Potential Costs

The capital costs above are based on current prices for the equipment. With the promulgation of the proposed regulation and the availability of data currently being gathered on the efficiency of the various vendors' monitors, it is very likely that one or two vendors will be inundated with orders. It is unreasonable that under such conditions these prices would remain at these levels. Additionally, as was experienced during BIF when CO and THC monitoring requirements were promulgated, the promised delivery times were unattainable necessitating additional expense to expedite construction and installation resulting in more costs to cover air transport and overtime. None of these costs can be accurately quantified, but a facility would be remiss in estimating the capital cost at anything less than 150% of quoted prices, and the first year's expense at less than 200% of the estimated routine maintenance cost estimate.

5.0 Benefits from CEM Installation

As noted in the discussion of CEM quality assurance, 30% of the affected kilns already meet the particulate emission criteria without any modification and 57% of the affected kilns meet the mercury emissions criteria without any modifications. In effect, these kilns must install at considerable capital and operating expense CEMs that do absolutely nothing to improve the environment. In fact, because of the increased risk to human health and environment due to manufacturing, installation, maintenance and testing of this equipment will result in a net harm to the environment. That is a negative benefit in requiring CEMS.

CEM1.059(157)(b) Because of the multiple CEMS units required by the rule (CO, O_2, HC, PM, Hg), waste combustion capacity and performance could be adversely affected by numerous waste cutoffs. Installation of duplicate backup CEM units is extremely costly and maintenance of such a system would be time consuming and labor intensive.

CEM1.066(177) Cytec has concerns about the additional downtime for repairs/replacement of these CEMS. The position that reliable and cost effective CEMS will be available within the three year time frame allowed for compliance is unsubstantiated. Unless and until reliable and cost effective units are commercially available this portion of the rule should be deferred.

CEM1.068(179) A primary concern with the proposed CEMS is the additional downtime HWCs will be subjected to for repairs/replacement of the CEMS. The capital costs required to purchase and install these units at the Olin facility are anticipated to be approximately $220,000 per unit. If backup CEMS were purchased for both units to enhance reliability and reduce downtime, the financial burden approaches $1,000,000. (Note: These costs are based on EPA's supporting documentation for MACT under the CEMS tables.)

CEM1.081(191) 30. Page 105 The Agency is in error on their statement that CEMS are less intrusive on the facility than operating parameter limits. Installation and maintenance for a CEM are burdensome, requiring dedicated personnel and new O&M procedures. Additionally, cost of installation and periodic testing impact operating budgets.

CEM1.085(204) 10.1 Cost Estimates for PM and Hg CEMS EPA's cost estimate for the CEMS are much lower than Fina's experience indicates. We suspect that EPA's cost estimate may just confuse the cost of the analyzer with the cost of the entire system including data processing, sample transport and conditioning, installation and frequent maintenance. Table 5 contains a summary of cost that DRE believes will be more realistic for PM and mercury CEMS.

Table 5 - Cost Estimates for PM & Hg CEMS

Capital Cost Estimate	**PM CEMS**	**Hg CEMS**
Analyzer	$70,000	$130,000
Installation	30,000	15,000
Data Management System	30,000	30,000
QA Manual	10,000	10,000
RATA Testing	20,000	20,000
Training	10,000	10,000
Capital Total Cost Estimate	**$170,000**	**$215,000**
Annual O & M Cost Estimate	**PM CEMS**	**Hg CEMS**
Maintenance Labor	30,000	30,000
Maintenance Parts	9,000	15,000
Quarterly CE Test	20,000	20,000
RATA Test (3 yr Cycle)	7,000	10,000
Training	5,000	5,000
Data Management	15,000	15,000
Total Annual O & M Cost Estimate	**$86,000**	**$95,000**

CEM2.005(093)(b) The cost of installing and maintaining CEMS can be prohibitive in itself and would not necessarily help owners to operate these units efficiently. This is particularly true when the CEM technology is new and not widely available.

CEM2.008(100)(b) Ciba is concerned that the use of mercury CEMs is mandated in the proposed rules. These analyzers are expensive ($120,000+ each for equipment only). The reliability of these CEMs is unknown; redundant analyzers may be needed to minimize incinerator downtime from analyzer failure. Feed rate control based on feed back from stack measurements is too risky given the severe penalties that may be imposed for minor excursions. The existing feed stream analysis and control methods will have to be retained to minimize the potential for violations.

CEM4.022(170K)(c) While EPA provides an inexpensive cost for an HCl analyzer in the preamble, pg. 17434, Volume IV suggests that only type of system demonstrated to work effectively on HWIs has a price about three times that used in the preamble. While CEMS may be the preferred environmental monitoring route and could lower the sampling and analytical tasks at some facilities, true costs must be determined.

CEM7.004(181) Comparing the cost of operating a CEMS in Germany cannot be compared to the cost of operation in the US since the EPA regulations require more system checks than the German regulations. In Germany, the zero point drift, sensitivity drift and automatic sensitivity correction must be checked at the maintenance interval (four weeks was the maintenance interval given for the example presented in this section) compared to daily checks required by the EPA. The German regulations require a yearly instrument response check compared to EPA's mandated quarterly cylinder gas audits. And finally, German regulations require a calibration check against a manual reference method every three to five years but the EPA would require a yearly RATA. Performance of a PM CEMS in the US cannot be inferred from PM CEMS performance in Germany because the regulations proposed by the EPA are much more stringent than the German regulations. The information presented in this support document does not begin to compare the performance of a PM CEMS with the proposed EPA regulations or to the proposed performance specifications.

CEM1.NOD.007(233)(b) If EPA is envisioning requiring redundant CEMS to support up time, then DOE requests that EPA justify the cost of redundancy through the Office of Management and Budget.

RCSP-101 (4) Mercury and PM CEMs should be optional. R-P does not believe that a reliable mercury CEM is commercially available. The CEM subcommittee of the American Society of Mechanical Engineers Research Committee on Industrial and Municipal Wastes has been conducting periodic meetings of CEM developers and interested technical experts to monitor development of multi-metal CEMS. Although several devices have shown promising results, no proven unit is likely to be commercially available for some time.

RSCP-129 (4) Understanding the concern of both the regulators and the regulated community, the following plan in the final rule would create the flexibility pertaining to Hg, PM, HCl/chlorine, SVM or LVM CEMs while still addressing the needs of all parties. It is suggested that the final rule not require Hg, PM, HCl/chlorine, SVM or LVM CEMs to demonstrate compliance with the rule. However, some facilities will want to include these CEMs as soon as they are practically available. If a facility chooses not to install CEMS, that facility should be required to perform an initial comprehensive performance test. Appropriate operating parameters will be reported and used to establish compliance. Should a facility choose to install one or more CEMS, the facility would be required to perform an initial comprehensive performance test to establish operating parameters but would not be required to repeat the test for those parameters covered by the CEMs the facility have until the permit comes up for renewal. The CEMs data would be used for demonstrating compliance, and operational parameter records would be maintained only as part of the operating record.

<u>Comment Summary</u>

Commenters suggest that EPA underestimated the cost of CEMS in the proposed rule. Other issues include:

- The need to cost redundant monitors;

- Cost effectiveness relative to other options needs to be considered, CEMS should only be required only if they are less expensive, and historically CEMS have always been more expensive;

- CEMS are more intrusive than other compliance options and the cost of facility outages due to CEMS downtimes needs to included;

- Having all facilities install equipment at the same time will raise costs;

- Costs overseas cannot be used because US costs are often higher; and

- EPA needs to justify costs incurred by the Department of Energy to the Office of Management and Budget.

<u>Response</u>

EPA has based its costs for the final rule on what it experienced during field testing. It does not believe these costs are understated.

When necessary, EPA did include the cost of redundant CEMS. EPA notes, though, that the allowance for data availability reduced the need for redundant monitors, but it likewise increased costs associated with monitoring operating and feedstream limits during CEMS outages. EPA did not include the cost of optional CEMS in its RIA since they are not an EPA requirement in this rule.

Cost effectiveness is included when EPA analyzes various compliance options. For instance, EPA did not propose requiring HCl and Cl_2 CEMS because chlorine-related operating parameter and feed requirements still would remain for metals control even with HCl and Cl_2 CEMS installed. EPA does not believe CEMS should be required only if they are less expensive than other options. Increased cost might be justified if those costs result in a better indicator of emissions. Finally, EPA agrees that CEMS probably cost a facility more to use than other compliance options. But the public benefits from using CEMS since emissions can be communicated better. Therefore, facility costs need to be weighed against societal benefits when making a choice of what compliance option to choose.

Facility outages caused by CEMS are included in the cost determinations. But again, EPA notes there is a markedly decreased cost associated with this due to EPA's acceptance of less than 100% data availability from the CEMS.

EPA agrees that in some situations, costs may increase if there is a sudden demand for one particular equipment. (That is, if demand suddenly increases yet supply stays constant, costs will rise.) But cost needs to be considered along with the overall supply to determine how much (if at all) costs will increase.

EPA is not aware of whether CEMS cost less overseas than here. All costs for CEMS included in this rule were based on domestic (US) costs for the equipment and supplies.

The Office of Management and Budget has reviewed this rule, including CEMS costs. However, EPA is uniquely puzzled by the Department of Energy's comments. EPA and DOE have a long history of cooperating together on CEMS and other projects.

Specifically, the Hg and PM CEMS Demonstration tests are examples, as well as projects at the EPA Incineration Research Facility in which ten CEMS were tested and at the DOE TSCA Incinerator in which three PM CEMS were tested. DOE has independently sponsored a multimetals CEMS and a Hg CEMS evaluation at the DOE TSCA Incinerator in Oak Ridge, TN. In addition, DOE has sponsored several developmental CEMS technology projects which are at various stages of completion. See Section 12 of the Technical Support Document Volume IV for more information on DOE-sponsored CEMS projects.

This cooperation was brought about by DOE's stated need to incorporate CEMS whenever possible so they can eliminate feedstream monitoring. Feedstream monitoring for DOE is a big concern because their wastes are primarily mixed radioactive and hazardous waste. Analyzing these feeds is often not possible or causes a substantiate threat to the health of the workers doing the sampling. EPA notes that DOE's comments are inconsistent with their longstanding position on the use of CEMS.

10. CEMS Certifications

Comment

CEM1.017(114)(a) CRWI supports an implementation program incorporating instrument certification, similar to TUV Certification conducted in Germany, with revised quality assurance guidelines similar to those that have been drafted by USEPA. [EPA Note: Assumes the commenter means a site specific certification.] We believe this approach will facilitate the development of emission monitors to a demonstrated acceptable user confidence level. CRWI proposes these modified guidelines: establish certification procedures and requirements for CEMs; define quality assurance (QA) procedures and criteria for the ongoing determination of the acceptability of the CEMs and the monitoring data; and specify minimum data capture requirements.

This approach extends the concepts of the Clean Air Act rather than RCRA and therefore begins to recognize that cycle time/response time of 15 seconds (as specified by the "BIF rule") is not applicable to most CEM parameters. CRWI's suggested approach also incorporates application of a "practical engineering philosophy" that recognizes the need for optional use of CEMS, site-specific instrument certification, allowance for minimum data availability by a CEM measuring emissions from a hazardous waste combustor, and the development of a process control system performance specification approach for CMS and CEM systems. Additional detail on the specific issues are in the following sections.

CEM1.019(114) CRWI supports the use of performance based certification of CEMS. The facility (or its contractors) should perform all tests and maintain the records of these tests in the operating record. The unit should then prepare a letter of certification for each CEM that would become a part of the operating record. EPA should not be in the business of certifying CEMS. If there is a need to certify instruments, equipment manufacturers should develop certification specifications, and if necessary, these specifications should be confirmed by an independent entity. CRWI would be supportive of a certification process for CEMs similar to that used in Germany since it incorporates a combination of laboratory and on-site (long-term) testing.

CEM1.020(117) 15. ISSUE: EPA Certification of CEMS. Rule Cite: EPA has solicited comments on whether a process should be established hereby CEMS manufacturers could certify that their CEMS meet the established performance specifications. (Proposed Rule, 61 FR 17442, Part Five, Paragraph II.F.I.e.) Comment: DoD supports a process where EPA establishes the performance standards and the equipment manufacturer certifies that the equipment meets the standards. The same type of system used for release detection in the underground storage tank program could be used to evaluate the equipment and demonstrate compliance with the standards. The evaluation procedures used to demonstrate the stack monitoring equipment meets the required performance standards would be:

a. The method is evaluated using the EPA's test procedures, for release detection equipment.
b. The method is evaluated using a voluntary consensus code or standard developed by a nationally recognized association or independent third party testing laboratory.
c. The method is evaluated using a procedure that is deemed equivalent to the EPA procedure by a nationally recognized association or independent third party testing laboratory. Either the manufacturer or an independent third party would be allowed to perform the demonstration tests. When installing the monitoring system, the owner/operator of the incinerator would obtain, and retain at the facility, the manufacturer's documentation that demonstrates the equipment being used meets the performance standards.

Recommendation: EPA establish the procedure described above to ensure accurate, reliable, CEMS.
CEM1.027(127)(a) <u>Continuous Emissions Monitoring Systems (CEMS)</u>--The proposed application of CEMS to HWCs should be modified to specify a sufficient time period for laboratory and site-specific field certification of the CEMS equivalent to that required for TUV certification in Germany

CEM1.027(127)(b) However, certain key aspects of the European manner of applying CEMS to HWCs, developed from real-world experience concerning the performance capabilities and limitations of commercially-available instruments, have not been addressed in the proposed rule. Specifically, the following provisions affecting the practicality of continuous monitoring of PM emissions per the European model should be incorporated into any CEMS requirement within the final rule: allowance of a sufficient time period (at least six months to one year) for laboratory and site-specific field certification of the CEMS equivalent to that required for TUV certification in Germany,

CEM1.028(127)(b) Establish a minimum data availability requirement which takes into account the actual performance achieved during the initial certification period.

CEM1.028(127)(d) However, certain key aspects of the European manner of applying CEMS to HWCs, developed from real-world experience concerning the performance capabilities and limitations of commercially-available instruments, have not been addressed in the proposed rule. Specifically, the following provisions affecting the practicality of continuous monitoring of PM emissions per the European model should be incorporated into any CEMS requirement within the final rule:

CEM1.028(127)(f) establishment of a minimum data availability requirement which takes into account the actual performance achieved during the initial certification period, and

CEM1.033(129)(f) Individual waste combustor unit considerations may allow demonstration of acceptable instrument reliability for certain systems and waste feed profiles.

An implementation program incorporating instrument certification, similar to TUV Certification conducted in Germany, is supported with revised quality assurance (QA) guidelines similar to those that have been drafted by EPA. We believe this approach will facilitate the development of emission monitors to a demonstrated acceptable user confidence level Implementation guidelines are suggested to:

- Establish certification procedures and requirements for CEMS,
- Define quality assurance procedures and criteria for the ongoing determination of the acceptability of the CEMs and the monitoring data, and
- Specify minimum data capture requirements.

This approach extends the concepts of the Clean Air Act rather than RCRA and therefore begins to recognize that cycle time/response time of 15 seconds (as specified by the "Boilers and Industrial Furnaces [BIF] rule") is not applicable to most CEM parameters. This implementation approach incorporates application of a "practical engineering philosophy" allowing:

- Optional use of CEMS,
- Site specific instrument certification,
- Minimum data availability by a CEM measuring emissions, and
- Development of site specific process control system performance specifications for continuous monitoring systems (CMS) and CEM systems.

The following specific comments provide additional detail on issues that formulate the basis for suggestions for application of CEMs for demonstration of compliance with the standard set by the proposed MACT Rule. These individual issues include:

- CEM Demonstrated Availability
- Limitations on Semicontinuous Systems
- CEMs Online Time
- PM Calibration Procedures
- CEM Test Frequency and Type of Test

CEM1.052(144) EPA's justification for using PM and Hg CEMS is based on their use in Germany. However the German requirements are very different than those proposed in this rule. As stated in Chapter 2, Volume IV of EPA's Technical Support Documents to this MACT Rule: "The German approach to the use of CEMS for compliance monitoring is based on the application of practical engineering philosophy. CEMS are employed, despite the known sensitivities to various factors such as particle composition and size distribution, within the statistical limitations determined by a site specific calibration procedure that defines the statistical relationship between CEMS response and PM loading. The reliability of the CEMS and the statistical relationships are assured as much as possible through performance based CEMS specifications and suitability testing in addition to long term tests run on plants at normal operating conditions. This allows the development of confidence in the utility of the CEMS."

However, the EPA's approach does not apply some of the key factors that are part of the German's "application of a practical engineering philosophy" including:

1. TUV equivalent certification (laboratory + on-site "trial period" for suitability testing)
2. Establishment of a combustion unit-specific maintenance interval
3. Data availability of >90%
4. A more reasonable frequency of calibration (3 - 5 years)
5. A more reasonable measure of valid data (minimum of 20 minutes per half-hour averaging period)
6. Development of an uncertainty factor during calibration which is used to determine the actual measured site-specific value which is an exceedence of the standard (emission limit + uncertainty)

The following concepts from other rules and the German approach should be incorporated into this proposed rule:

1) Base the frequency of collection of information on the pollutant-specific needs. Short- term (e.g., 15-second) CO response is far more valuable for the control of process emissions than short-term particulate or metal emissions information.
2) Incorporate the concept of data availability for all CEMS. Allow the use of process parameter monitoring to measure compliance assurance when the CEMS is not operational (e.g., APCE parameters when the CEMS for particulate is off-specification). Base the data availability on actual availability established over some specified period of time while initially using the CEMS. Establish a "trial period" (like German Suitability Test Period) during which the CEMS is being developed on an experimental basis at the unit. During this "trial period" establish the final quality objectives for the CEMS.
3) Incorporate "uncertainty" into allowable maximum CEMS measured emission limits for each parameter over each averaging time. These concepts will allow the use of CEMS to be more reasonable.

CEM1.057(153)

- For developing CEMS, establish a 'trial period' (like the German suitability test period) during which the CEM is being developed on an experimental basis at the unit. Such data is for development only. It does not represent actual emissions until the CEM is accepted by both the user and the regulatory agency;
- During this trial period establish the final quality objectives for the developing CEM; and
- During the trial period, and as a backup when required, use alternative means for demonstration of compliance with the emission standard.

CEM1.058(153) CWM supports the Agency's proposal to establish a process for CEM manufacturers to certify that their CEMs meet the established performance specifications. This would save the regulated industry substantial material costs and manpower, and help to ensure the CEM is properly designed and has been tested to perform at the operating conditions specified in the proposed MACT rulemaking. CWM is unclear, however, how this certification will be implemented because the language in the preamble additionally refers to certification by EPA.

CEM1.067(177) 9. An EPA sponsored certification program for CEMS has been proposed as part of the MACT standard. Cytec recommends that the task of certifying monitors be kept as responsibility of the manufacturers. In all likelihood, the certification program will be developed by these manufacturers, acting as contractors to EPA. Since it will be necessary to develop methods of guaranteeing performance to market these analyzers and is in the best interest of the vendors to do so, the task could be done most efficiently by minimizing the Agency's role in this process.

Further, minimum requirements for operation and performance of a monitor should be assured by a relative calibration audit prior to initial operation for compliance. Demonstration of comparable results with calibration gases and certification of proper averaging and recording programs from the manufacturer should be adequate. The introduction of an additional EPA certification program will delay the implementation of monitoring requirements, increase costs, and unnecessarily complicate the proposed CEMS requirements. If the EPA does decide to institute a separate program, Cytec recommends that a grace period similar to that allowed by current RCRA standards for performance testing to facilities that are awaiting certification of specific CEMS equipment to comply with proposed monitoring requirements.

CEM1.069(179) 11. An EPA sponsored certification program for CEMS has been proposed as part of the MACT standard. Olin recommends that the task of certifying monitors be kept as a responsibility of the manufacturers. Since it will be necessary to develop methods of guaranteeing the performance of the CEMS to meet the EPA specifications, the task could be done most efficiently by the manufacturers.

Further, minimum requirements for operation and performance of a monitor should be assured by a relative calibration audit prior to initial operation for compliance. Demonstration of comparable results with calibration gases and certification of proper averaging and recording programs from the manufacturer should be adequate. The introduction of an additional EPA certification program will delay the implementation of monitoring requirements, increase costs, and unnecessarily complicate the proposed CEMS requirements. If the EPA does decide to institute a separate program, Olin recommends that a grace period similar to that allowed by current RCRA standards for performance testing to facilities that are awaiting certification of specific CEMS equipment to comply with proposed monitoring requirements.

CEM1.084(204) 8.9. EPA Certification Program EPA should not adopt a CEMS certification program similar to the TUV organization in the Federal Republic of Germany. One reason is that CEMS are not currently manufactured in the U.S. as a total system meeting EPA's definition of CEMS. Different manufacturers produce the analyzer subsystem, data management subsystem, and sample conditioning and transport subsystem. Instead EPA should issue a guidance manual that address critical aspects of CEMS design and installation. A qualified competent registered professional engineer then could certify the total installation in a manner similar to the subpart J tank certification.

Comment Summary

Commenters are divided about the need for CEM certification, specifcally:

- EPA should (and should not) certify CEMS; and
- Equipment manufacturers should certify their CEMS to EPA's satisfaction before marketing them.

They also raise the issue of whether certifications should be performed at every site, specifically:

- There needs to be a sufficient time to allow for laboratory and field testing of the CEMS; and
- CEMS performance criteria should be based on what can be achieved on a site-specific basis.

Response

Relative to whether EPA should certify CEMS, we note that EPA has initiated a program called Environmental Technology Verification (ETV). The issue of whether EPA should certify CEMS is being dealt with in here.

Relative to whether CEMS certifications should be performed on a site-specific basis, EPA agrees that performance criteria for optional CEMS should be based on what is demonstrated to be achievable at the source using the CEMS. We have incorporated this approach to certifying optional CEMS into the final rule. Finally, EPA believes facilities should negotiate issues such as time requirements with their permitting authority whenever they want to use an optional CEMS.

11. Alternative Monitoring

Comment

CEM1.031(128) Permissible alternative compliance systems should not be limited to feedstream monitoring, as proposed by EPA, because the feedstream monitoring options are overly restrictive.

CEM1.041(139) FMC and FCC propose the development of a provision in this rule to allow for Predictive Emission Monitoring ("PEM") of key incinerator pollutants based on an experimentally developed model relating process variables to predict pollutant concentrations or mass flow rates. Both particulate and hydrocarbon emissions are good candidates for predictive modeling. Predictive Emission Monitoring Systems ("PEMS") would be able to be cheaply implemented, but still be able to satisfy public concern over the availability of continuous hazardous waste incinerator emission information. We also propose the use of PEM in lieu of Automatic Waste Feed Cutoff requirements, provided that there is adequate information to perform model estimates of incinerator emissions. For information on PEM, please refer to the PEMS specification document available on the CEMS section of the TTN EMTIC bulletin board.

CEM1.064(170) E. CKRC Alternative to CEMs As CKRC submitted to EPA in February 1996, we believe there may be an opportunity to work with the Agency to improve upon the BIF Rule Appendix IX DMCL approach to monitoring emissions on a more frequent basis. CKRC is committed to working with the Agency in an effort to improve this approach and/or explore other CEM alternatives. Unfortunately this brief comment period did not provide ample opportunity to fully pursue this issue as the majority of our industry's CKD data resources were under the demands of EPA's 3007 information request also due on August 19, 1996. CKRC will resume its efforts to explore this issue in an attempt to coordinate with the Agency's timeline for a Federal Register Notice on CEM alternatives.

RCSP-114 (3) 5. It is CRWI's understanding that the German TUV certification process may take as long as a year. The current proposed rule has not made allowance for certification time. Potential Solutions 5. If EPA chooses to use the German TUV certification process, allowances for the extra time needed to develop that certification should be included.

RSCP-143 (5) <u>CEMS Certifications</u> The explanation of the proposed CEM regulation begins on FR17427 of the preamble and is detailed in the regulations beginning on FR17495. Part of the justification for the EPA's promotion of the CEMs is that it is difficult and expensive to perform proper feedstream analyses. EPA cites the fact that several cement kilns and lightweight aggregate kilns have been fined for inadequate feedstream analysis plans in support of their justification. In comparison, feedstream analyses will be much less expensive than and many times less prone to operational problems than the CEM compliance even more troublesome.

RSCP-153 (3) C. EPA Certification of CEMs (61 Fed. Reg. at 17,442). CWM supports the Agency's proposal to establish a process for CEM manufacturers to certify that their CEMs meet the established performance specifications. This would save the regulated industry substantial material costs and manpower, and help to ensure the CEM is properly designed and has been tested to perform at the operating conditions specified in the proposed MACT rulemaking. CWM is unclear, however, how this certification will be implemented because the language in the preamble additionally refers to certification by EPA.

<u>Comment Summary</u>

Commenters supported the idea that we allow flexibility for facilities to use compliance methods other than those prescribed in the final rule. Predictive Emissions Monitoring (PEM) is mentioned as such an alternative.

<u>Response</u>

EPA encourages facilities to identify better ways to comply with standards, such as Predictive Emissions Monitoring, by using the alternative monitoring provisions found in 63.8(f) of the General provisions.

EPA notes CKRC's attempt to identify alternatives to CEMS and understands their inability to respond, given the other tasks they are working on, including the over two feet worth of double sided, single spaced comments they supplied for the proposed rule alone.

12. CEMS Test Requirements

Comment

CEM1.038(129) CEM TEST FREQUENCY AND TYPE OF TEST Discussion If a hazardous waste combustor is to proceed with a strategy to utilize CEMs for demonstration of compliance with MACT Standards, a combination of calibration audits and test audits will be required as part of the quality assurance and quality control programs. EPA's suggested frequency of testing and type of testing proposed in the MACT Rule for CMS and CEMs instruments as listed in the following table is generally supported by the CEM user community.

Instrument	**Quality Control**	**Quality Assurance**	
		Test Type	Frequency
CMS			
Temperature, flow, pressure, etc.	Written protocol	Performance evaluation test plan	Each time a performance test is conducted
CEMs			
Multi-metals	Written protocol	RATA	Each time a performance test is conducted
		ACA	Once per year
PM	Written Protocol	RCA	Once per 18 months
		ACA	Once per 3 months
Hg	Written Protocol	RATA	Each time a performance test is conducted
		ACA	Once per 3 months
HCl, Cl_2, CO, THC, O_2	Written protocols	RATA	Once per year
		ACA	Once per 3 months

CEM2.033(143) 5.0 Instrument Calibration and Zeroing and the Absolute Calibration Audit Part of the daily audit required for any monitoring system includes a zero and span calibration. To accomplish this for the mercury monitor requires that a gas or solution containing mercury be injected into the analyzer. Decidedly this is a small amount of material, the technician who executes this procedure however is in intimate contact with this equipment and is potentially exposed on a routine basis. There are certainly precautions that can be taken to mitigate this potential exposure but this activity should be included in any risk assessment of increased monitoring. The HWC regulation has added a number of such calibration audits. Daily calibration audits for the multi-metals CEM. Quarterly absolute calibration and interference response tests for the mercury analyzer. Daily calibration drift and quarterly absolute calibration audits and interference. response tests for the hydrogen chloride and chlorine analyzers. EPA's concern for the "potentially dangerous" metals spiking apparently does not extend to CEMS which operation requires this level of daily, quarterly and annual calibration testing using the same toxic materials. Under BIF the potential exposure occurred over a very limited period once every three years (interim status) or five to ten

years (permit status) versus daily. Under BIF this potential exposure was limited to a much smaller group of people with considerable elapsed time between episodes. Now, however, under the proposed HWC rules the potential exposure could easily become chronic low level exposure to a much larger group of people.

In addition to the human health risk of the technicians exposure, there is also the risk to human health and environment due to manufacture, testing and transport of these expensive reagent grade chemicals to each facility. The EPA should also consider the substantial risks involved in merely bringing the CEM instruments on line. EPA's BIF requirement that CO and THC CEMS be installed was followed by thousands of man-hours by facility and manufacturers technicians debugging their systems. Many of these manufacturer technicians spent weeks at a time on the road traveling from one facility to another struggling to make them work. The proposed CEM equipment, by comparison to the proposed HWC regulation to the CO/THC CEMS, are much more complex devices, likely adding to these transportation risks as well as risks similar to stack testing during equipment maintenance and installation.

Comment Summary

Commenters summarized the CEMS and CMS test requirements and said they are supported by the CEMS user community. A second commenter noted that technicians would have to use harmful chemicals in order to certify and test Hg CEMS.

Response

EPA notes the general agreement the commenter had regarding EPA's proposed CEMS test frequency. EPA hopes facilities will adopt this frequency if they elect to use these CEMS.

EPA did not encounter the problems described by the second commenter during its demonstration test of Hg CEMS, but notes the commenters concern. See section 2 issue 2 of this volume of the Comment Response Document for more.

13. Field Testing of Hg and PM CEMS (General)

Comment

CEM2.014(114) CRWI is aware of current field testing of mercury and PM continuous emission monitors. CRWI would welcome the opportunity to continue the dialogue on these tests as data becomes available.

CEM2.017(114)(c) ENSR's evaluation of the demonstration programs sponsored by EPA to date also show that PM and Hg monitors are clearly not ready for commercial use. Test programs conducted by EPA's Combustion Research Facility in Arkansas, at a Rollins facility in Bridgeport, NJ, and at the Lafarge facility in Fredonia, KS, all showed poor correlation with manual sampling methods as well as problems with analyzers and associate hardware. These test programs clearly show that much, further development will be required before these analyzers can be used as proposed.

Potential Solutions
CRWI supports current demonstration projects at the Holly Hill, SC, cement kiln and the Wilmington, DE, incinerator. CRWI understands the needs of regulators to have a better understanding of actual emissions and the needs of the regulated community to have reliable instrumentation to provide that data. Based upon an assessment of the PM and Hg monitors we have, EPA should not mandate their use. CRWI hopes to continue working with EPA during and after the demonstration project to develop suitable methods to remove the disincentives for using optional CEMs and to provide additional incentives for using CEMs. CRWI would like to assist the Agency in developing a generic plan that can be used with any developing CEM technology to incorporate that technology into operating practices.

CEM2.035(143)

96-WA64A.02

Performance Tests of Mercury Continuous
Emissions Monitors at the U.S. EPA
Incineration Research Facility

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AIR & WASTE MANAGEMENT
ASSOCIATION

For Presentation at the
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INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is currently developing more stringent emission standards and considering changes in the way that permits for waste combustion facilities are handled. More public involvement in the process has been proposed. Because the public's apparent perception of incinerators is that high concentrations of hazardous compounds are continually being released from the stacks of the thermal treatment devices, a means by which the 'real-time' (defined as ranging from instantaneous to a within-several-hours time frame) organic and metal emissions can be monitored would be of great benefit to both regulators and the regulated community. The ability to have "immediate" knowledge of stack emissions would provide assurances that the thermal treatment device is operating correctly or indicate the change of operating conditions needed to adjust stack emissions. Thus, EPA's Office of Solid Waste (OSW) and the Office of Solid Waste and Emergency Response would like this monitoring capability as a means of responding to and allaying the public's fears by showing that good, safe, and clean combustion practices can be demonstrated.

One pollutant of regulatory interest from waste combustion sources is mercury. Given this interest, and the desire to continuously measure flue gas mercury concentrations, several developers have designed, and are bringing to market, mercury continuous emission monitors (CEMs). The initial market for these instruments is currently developing in Europe, and some of these developers' offerings are proceeding through certification processes. However, use of mercury CEMs is likely soon to be mandated in the United States.

In anticipation of such a mandate, EPA's National Risk Management Research Laboratory (NRMRL), in concert with the Department of Energy's (DOE's) Savannah River Technical Center (SRTC), initiated a program in 1995 to test developing CEM approaches for measuring hazardous organic and trace metal concentrations in waste combustion flue gas streams. The general objective of this program was to test several prototype CEMs and establish or estimate for each unit the effectiveness, reliability, accuracy, and detection limit. The test program was performed at EPA's Incineration Research Facility (IRF) in Jefferson, Arkansas. Three mercury CEMs were tested in the program. Test results for these mercury CEMs are discussed in this paper.

TEST PROGRAM

The testing consisted of obtaining quantitative measurement data on four measures of CEM performance checked in a relative accuracy test audit (RATA) of a CEM aa described in 40 CFR 60, Appendix F.

- Relative accuracy (RA): the absolute mean difference between the concentrations determined by the CEM and the value determined by the reference method (RM), plus the 2.5 percent error confidence coefficient of a series of tests, divided by the mean of the RM tests

- Calibration drift (CD): the difference in the CEM output reading from the established reference value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place; the reference value is established by a calibration standard which has a concentration of nominally 80 percent or greater of the CEM's full scale (span) reading capability

- Zero drift (ZD): the CD where the reference value is 0

- Response time: the time interval between the start of a step change in the concentration of the monitored gas stream and the time when the CEM output reaches 95 percent of the final value

Most of the test program effort was devoted to measuring the RA of each CEM tested. Measuring a CEM's RA requires comparing the monitored analyte concentration reported by the CEM to the concentration determined by the RM for the analyte. The RM used for mercury was draft Method 29, the EPA multiple metals method documented in the boiler and industrial furnace (BIF) rules (Reference 1).

Test Facility
The test program was conducted in the pilot-scale rotary kiln incineration system (RKS) at the IRF. Figure 1 is a process schematic of the RKS as configured for these tests. The RKS consists of a primary combustion chamber, a transition section, ands fired afterburner chamber. After exiting the afterburner extension, flue gas flows through a quench section that is followed by a primary air pollution control system (APCS). The initial element of thc primary APCS for these tests was the venturi scrubber/packed-column scrubber combination shown in Figure 1. This scrubber system removes from the flue gas most of the coarse particulate and any acid gas, such as HCl. Following the scrubber system, the flue gas is reheated To about 120°C (250°F) by a 100-kW electric duct heater, then passed through a fabric filter (baghouse). The baghouse removes most of the remaining flue gas particulate. Downstream of the baghouse, a backup, secondary APCS, comprised of an activated-carbon adsorber and a high-efficiency particulate air (HEPA) filter is in place.

Mercury CEMs Tested
To solicit candidate instruments for testing in the project, announcement was published in the January 4, 1995 *Commerce Business Daily* (CBD). Several proposals were received in response to this announcement, including proposals from four mercury CEM developers. These developers are listed in Table 1.

The EcoChem CEM, termed the Hg-Mat 2 Analyzer by EcoChem, provides a continuous measure of flue gas total mercury concentration. Sample gas is transported in a heated (200°C) sample line to thc analyzer. Sample gas is first conditioned by passing through two reactors which convert ionic mercury to elemental mercury and desorb any particle-bound mercury. The mercury concentration of the sample gas is subsequently measured using cold vapor atomic absorption spectroscopy (CVAAS).

The Perkin-Elmer CEM, termed the MERCEM by Perkin-Elmer, also uses a heated (185°C) sample line to transport sample gas to the analyzer. The sample gas probe for the MERCEM includes two sintered metal filters for fine particulate removal. The MERCEM also converts ionic mercury to elemental mercury via reaction with stannous chloride ($SnCl_2$) solution. However, the MERCEM also includes a gold trap for mercury concentration via amalgamation. Including the gold trap allows for a lower detection limit. Mercury quantitation is also by CVAAS.

The Euramark CEM, manufactured in Europe by Verewa and termed the HM-1400 total mercury analyzer, also relies on a total elemental mercury determination using CVAAS. In the Euramark CEM, sample gas is transported to the instrument via a heated sample line. However, it is first passed through a heated (800°C) oven which vaporizes any particulate-bound mercury. Sample gas is then mixed with a constant flow of hydrochloric acid (HCl) which dissolves any ionic mercury as mercuric chloride ($HgCl_2$). Dissolved ionic mercury is then reduced to elemental mercury by reaction with sodium borohydride ($Na.BH_4$). With all sample gas mercury now present as vapor phase elemental mercury, the CVAAS detector is able to give a total mercury concentration.

The Senova CEM differs from the other three in that the conversion of ionic mercury to elemental mercury is accomplished using a proprietary solid reactor bed and the mercury concentration measurement is performed using solid-state noble metal thin-film microsensors. Mercury in the conditioned sample gas adsorbs onto the noble metal thin film, causing a change in its electrical resistance. This change is directly related to the mercury concentration. Depending on the analyzed sample size and mercury concentration, a number of samples can be analyzed before the thin film becomes saturated. When saturated, the thin film is thermally regenerated and a new cycle of gas sample analysis begins. The thin film microsensor also requires that moisture and acid gases be removed from the sample gas. This is also done in the sample conditioning system via a dryer and a solid acid as sorbent bed. Provision for including a gold trap for mercury concentration, if needed, also exists with this CEM.

All four developers were invited to participate in the test program and all four accepted. Unfortunately, the Euramark CEM was damaged in transit to the IRF and repair efforts by the Euramark team were unsuccessful. Thus, no testing of the Euramark CEM was performed.

Testing Procedures

The three mercury CEMs tested sampled RKS flue gas at the scrubber exit location, upstream of the flue gas reheat/baghouse system. The length of ductwork accessible for testing at this location had four sets of sampling ports, each set comprised of four individual ports at 90° increments in the duct circular cross section. All three mercury CEMs were simultaneously tested. Thus, each CEM had access to one of the four sets of ports at the sampling location. The fourth set of ports was dedicated to the RM sampling performed by the IRF staff.

The major portion of the test program consisted of performing three sequential RM measurements, while the tested CEMs were in operation, at each of three flue gas mercury concentrations. Thus, the test program supplied nine sets of parallel RM and CEM reading data, three at each of three mercury concentrations. These nine sets of parallel RM and CEM data supported the calculation of each CEM's RA. Thus, up to three RAs were calculated for each CEM, one at each of the three flue gas concentrations tested. Other test efforts discussed below supported the measurements of' CD, ZD, and response time. To ensure that the sets of RM/CEM concentration data were indeed parallel and comparable, the developers were notified to the start and stop times of each RM procedure so that they could report an average mercury concentration that corresponded directly to the RM measurement period.

Performing one mercury RM measurement requires a 2- to 2.5-hour flue gas sampling period. With contingency for sampling train filter changes and other sampling procedure delay events, a 3-hour time period was normally allotted to completing one RM test. Thus, the three sequential RM tests were targeted for completion over a 9-hour period of continuous, steady RKS operation at a nominally constant scrubber exit flue gas mercury concentration. This nominally 9-hour period was termed 1 test day. Testing at three different scrubber exit flue gas concentrations, thus, required 3 test days.

At the beginning of each test day, The RKS was brought to steady operation at the desired incineration conditions firing natural gas. After the RKS combustion gas CEMs were calibrated and all RM sampling preparations completed, test waste feed was initiated and steady RKS operation reestablished. During this time, each CEM developer was given the opportunity to calibrate his instrument. This calibration included zero and span checks. The day's test, the three sequential RM sampling efforts began after all CEMs had completed zero and span checks. The first of the three sequential RM sampling efforts began after the CEMs being tested had been calibrated, provided that at least 1 hour of waste feeding had elapsed. At the end of the test day (after completion of the third RM sampling period), up to two successive step changes (increases and decreases) in flue gas analyte concentrations were induced. Measurements of CEM responses to these step changes gave data on instrument response time.

After these step change/response observation exercises, test waste feed was stopped and each developer was given the opportunity to check the calibration of his instrument These post-test checks yielded the measures of CD and ZD. The RKS continued to operate, firing natural gas until the kiln was visually clear of bottom ash, or for 2 hours, whichever time was longer. After this time period, the RKS was set to an unattended operating condition firing natural gas in preparation for the next test day.

Test Waste Feed
The mercury CEM tests were performed as part of the EPA-NRMRL/DOE-SRTC program to test hazardous organic compound and other, multi-metal CEMs noted above. Thus, the incinerator feed material and system operating conditions were the same for all tests in the program.

The incinerator feed material was a synthetic hazardous waste comprised of an attapulgate clay solid so/bent combined with a mixture of 14 trace metals (mercury plus 13 others) and volatile organic compounds (VOCs). The mixture of organic compounds added to the sorbent base contained 76 percent toluene by weight, with 12 percent each of chlorobenzene and tetrachlorocthene. This mixture was combined with the clay sorbent in the ratio of 1.0 kg of organic constituent mixture to 2.4 kg of clay. The resulting organic compound/clay mixture, thus, contained nominally 22.4 percent of toluene and 3.5 percent each of chlorobenzene and tetrachloroethene. Its chlorine content was nominally 4.1 percent and its heating value nominally 10.7 MJ/kg (4,590 Btu/lb). The mixture was a free-flowing solid with no free-standing liquid. Thus, for all tests the mixture was continuously fed to the RKS via a screw feeder system.

For all tests, the target clay/organic mixture feedrate was 68 kg/hr (150 lb/hr). The target kiln exit gas temperature was 870°C (1,600°F), and the target afterburner exit gas temperature was 1,065°C (1,950°F). Combustion system temperatures were maintained by controlling the auxiliary, fuel (natural gas) firing rates to system combustion chambers. The kiln rotation rate was set to give a kiln solids residence time of about 1 hour.

Mercury and the other trace metals were added to the RKS, to result in scrubber exit flue gas levels via two routes. Both routes used an aqueous spike solution of the metals. The composition of the most concentrated spike solution used for the mercury CEM tests, is given in Table 2. The most concentrated solution was added for the test day at the high target flue gas mercury concentration. This solution was diluted four-fold and eight-fold for the test days at the intermediate and low target mercury concentrations. The target concentrations of mercury and the other metals are given in Table 3.

The two routes of metals addition were incorporated into the clay/organic mixture and atomized into the kiln main burner flame. The solid waste feed route was effected by metering the aqueous spike solution into the clay/organic liquid mixture at the screw feeder just prior to feed introduction into the kiln. A gear pump was used to inject the spike solution at a flowrate of 2 L/hr. The burner flame atomization route was effected by spraying the aqueous spike solution through the liquid feed nozzle of the kiln dual fuel main burner at a rate of 6 L/hr.

In addition to mercury and other metals spiking, a solution of volatile and semivolatile organic compounds was injected into the partially quenched afterburner extension flue gas. This organic solution injection was used to establish target flue gas organic compound concentrations for the tests of hazardous organic compound CEMs in the test program. Injecting this solution during the mercury CEM tests was, again, performed so that incineration conditions for all CEM tests would be nominally the same.

TEST RESULTS

Table 4 summarizes the results of three sequential RM measurements performed each mercury CEM test day and compares these to the corresponding three mercury CEM measurements. As noted above, the RM for the mercury CEM tests was Method 29. Collected sample analyses were according to that method with ultimate mercury quantitation by CVAAS using Method 7470 (Reference 2). Calculated RAs for each CEM are also given in the table for the three test days, each representing a different flue gas mercury concentration.

The table indicates several periods during which the Perkin Elmer and the Senova CEMs were not in operation. In the Senova case, a critical part of the Senova CEM was broken when packing the CEM for shipment to the IRF. The time required to locate and secure a replacement pan caused a delay in the Senova team's arrival at the IRF such that the first test day, at the intermediate flue gas mercury concentration, was missed. The Senova CEM was in operation on the second test day, at the high flue gas mercury concentration. However, a malfunction that caused unstable sample gas flow to the analyzer prevented Senova from obtaining valid data on the third and last day of testing at the low flue gas mercury concentration. Thus, the Senova team was able to obtain only one day of test results.

The Perkin Elmer team was unable to obtain reliable results during the second RM period on the first test day (intermediate concentration) because of a buildup of a white powder which clogged the probe sintered metal filter. On the second day of testing (high concentration) the Perkin Elmer CEM developed a defect at the sample drain pump and a broken probe fitting, so no data were obtained for the first two RM periods on this test day. As a result, no RA could be calculated for this Perkin Elmer CEM for the high concentration test, and the RA in Table 4 for the intermediate concentration test is based on only two pairs of RM/CEM measurements.

The data in Table 4 show that the EcoChem CEM had an RA of about 60 percent for both the low and the high concentration tests. The RA at the intermediate concentration was increased, at 92 percent. The RA of the Perkin Elmer CEM was 602 percent at the low mercury concentration and 1,150 percent (based on two measurement pairs) at the intermediate mercury concentration. The RA of the Senova CEM was 186 percent at the one test concentration having data.

As noted above, after the third sequential RM sampling period for a test day was completed, up to two step changes in flue gas mercury concentrations were attempted to assess CEM response time. These step changes consisted of stopping the feed of the mercury-containing aqueous metal spike solution to one or both of the feed routes, and/or switching the concentration of the aqueous spike solution being fed to a lower concentration preparation. However, these process step changes did not in result in actual flue gas concentration step changes because of the presence of the entire incinerator and scrubber system between spike solution addition points and the CEM measurement location. Thus, only qualitative response time information was obtained.

Each mercury CEM developer performed pre- and post-test calibrations and zero checking for their instrument on the days the instrument was in operation, and used these data to calculate ZD and CD. Reported results are given in Table 5.

All three mercury CEM developers state the capability to detect flue gas mercury concentrations down to the 2 to 3 µg/dscm range. Test data from the low concentration test day confirm that the EcoChem and the Perkin Elmer CEM can measure mercury in the 10 to 20 µg/dscm range.

OSW is planning a demonstration of mercury GEM on actual industrial waste combustors during 1996. No further pilot-scale testing of mercury CEMs is planned.

DISCUSSION OF RA

The test results discussed above show that the measured Ras of the mercury CEMs tested were often quite large. In fact, even the RAs for the best performing CEM, based on qualitative comparisons of CEM readings to RM measurements, were no better than 60 to 90 percent. By comparison, EPA performance specifications (PSs) for combustion gas CEMs, O_2 for example, are generally in the range of 20-percent RA. This raises questions concerning whether mercury CEMs, even after further development, can potentially meet a 20-percent RA PS.

A partial answer to this question lies in the statistics of the RA definition. RA is defined as follows:

$$RA = \frac{|\bar{d}| + \frac{t_{0.975}}{\sqrt{n}} SD}{\overline{RM}}$$

Where:

$|\bar{d}|$ = The absolute value of the mean difference between the CEM reading and the corresponding RM measurement

n = Number of pairs of CEM/RM measurement taken

$\overline{RM}$ = Mean RM measurement value

SD = Standard deviation of the differences between the CEM reading and the RM measurement

$t_{0.975}$ = The t-statistic at the 2.5 percent error confidence

The RATA of a combustion gas CEM requires that nine CEM/RM measurement pairs be the minimum taken to perform an RA calculation. For nine measurement pairs, $t_{0.975}$ is 2.306 and

$$\frac{t_{0.975}}{\sqrt{n}} = 0.769$$

While the tests in this program were designed to collect nine pairs of CEM/RM measurements, the nine pairs were collected over three flue gas concentrations. Thus, each RA calculation performed used at most three CEM/RM measurement pairs. For three measurements, $t_{0.975}$ 4.303 and

$$\frac{t_{0.975}}{\sqrt{n}} = 2.484$$

Consider the case in which, based on three CEM/RM measurement pairs, the corresponding RA was 60 percent, for example. Now, assume that had an additional six paired measurements had been taken, for a total of nine, that the absolute mean difference ($|\bar{d}|$), the standard deviation of the differences (SD), and the mean RM concentration ($\overline{RM}$)been the same for both the initial three measurements and all nine measurements. In this case, the ratio of the RA corresponding to the nine measurements (RA_9) to that corresponding to the three measurements (RA_3) would be

$$\frac{RA_9}{RA_3} = \frac{|\bar{d}| + 0.769\ SD}{|\bar{d}| + 2.484\ SD}$$

Two limiting cases now exist, that where $|\bar{d}| >> SD$ and $|\bar{d}| << SD$. In the first case

$$\frac{RA_9}{RA_3} = 1$$

but in the second case

$$\frac{RA_9}{RA_3} = \frac{0.769}{2.484} = 0.31$$

The ratio for intermediate cases would be between these two limits.

Instances in which the second case holds are likely to be encountered. For example, if both positive and negative measurement differences are encountered, then $|\bar{d}|$ may be close to, or equal to, 0. In cases such as these, an RA based on three measurements at 60 percent could have been reduced to about 20 percent had nine measurements been performed.

In summary, even though the RAs measured in these tests were, at best, about 60 percent, had nine measurements at a given test concentration been performed, RAs might have been at reduced levels on the order of 20 percent.

ACKNOWLEDGEMENTS

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REFERENCES

10. 40 CFR Part 266, Appendix IX.

11. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846, Third Edition, Revision 2, September 1994.

Table 1. Mercury CEMs selected for testing.

Developer	Approach
EcoChem	Cold vapor atomic absorption spectroscopy
Perkin-Elmer	Gold trap amalgamation collection, cold vapor atomic absorption spectroscopy analysis
Senova	Noble metal film solid state chemical microsensor
Euramark[a]	Cold vapor atomic absorption spectrometry

[a]Euramark intended to participate, however the Euramark CEM was damaged during transport and could not be brought into operation.

Table 2. Concentrated aqueous spike solution composition.

Metal	Metal concentration, mg/L	Compound	Compound concentration, mg/L
Antimony	32	$C_4H_4KO_7Sb$	85
Arsenic	18	As_2O_3	24
Barium	630	$Ba(NO_3)_2$	1,200
Beryllium	6	10,000 ppm Be standard	NA*
Cadmium	7.5	$Cd(NO_3)_2$ - 4 H_2O	21
Chromium	150	$Cr(NO_3)_2$ - 9 H_2O	1,120
Cobalt	160	$Co(NO_3)_2$ - 6 H_2O	778
Lead	140	$Pb(NO_3)_2$	224
Manganese	52	$Mn(NO_3)_2$ - 6 H_2O	272
Mercury	26	$Hg(NO_3)_2$ - H_2O	44
Nickel	190	$Ni(NO_3)_2$ - 6 H_2O	941
Selenium	70	SeO_2	98
Silver	11	$AgNO_3$	17
Thallium	7.5	$Tl(NO_3)_3$ - 3 H_2O	16

*NA = Not applicable.

Table 3. Test trace metals and target flue gas concentrations.

	Target flue gas concentration, µg/dscm		
Metal	**Low**	**Intermediate**	**High**
Antimony	5	10	40
Arsenic	2.5	5	20
Barium	25	50	200
Beryllium	0.25	0.5	2
Cadmium	2.5	5	20
Chromium	10	20	80
Cobalt	5	10	40
Lead	25	50	200
Manganese	2.5	5	20
Mercury	10	20	80
Nickel	5	10	40
Selenium	25	50	200
Silver	2.5	5	20
Thallium	2.5	5	20

Table 4. Measured flue gas concentration and RAs for the mercury CEM tests.

	Mercury concentration (µg/dscm)			
		EcoChem	**Perkin-Elmer**	**Senova**
Test	**RM**[2]	**CEM**	**CEM**	**CEM**
Low Mercury Concentration				
RM 1	21	22	78	NO[c]
RM 2	16	20	42	NO
RM 3	13	19	11	NO
RA[b], %		60	602	NC[d]

Intermediate Mercury Concentration				
RM 1	56	83	61	NO
RM 2	34	43	NO	NO
RM 3	40	56	125	NO
RA, %		92	1,150	NC
High Mercury Concentration				
RM 1	119	137	NO	232
RM 2	94	81	NO	116
RM 3	86	62	405	165
RA, %		61	NC	186

[a]RM: reference method, Method 29.
[b]RA: relative accuracy.
[c]NO: not operational.
[d]NC: not calculated.

Table 5. Measured CEM ZD and CD

	Instrument drift, %		
	EcoChem	**Perkin-Elmer**	**Senova**
Test	**CEM**	**CEM**	**CEM**
Low Mercury Concentration			
ZD[a]	0	0.14	NO[c]
CD[b]	0	21	NO
Intermediate Mercury Concentration			
ZD	-10	0.13	NO
CD	0	2.8	NO
High Mercury Concentration			
ZD	-23	NO	-4.8
CD	0	NO	4.3

[a]ZD: zero drift.
[b]CD: calibration drift.
[c]NO: instrument not operating.

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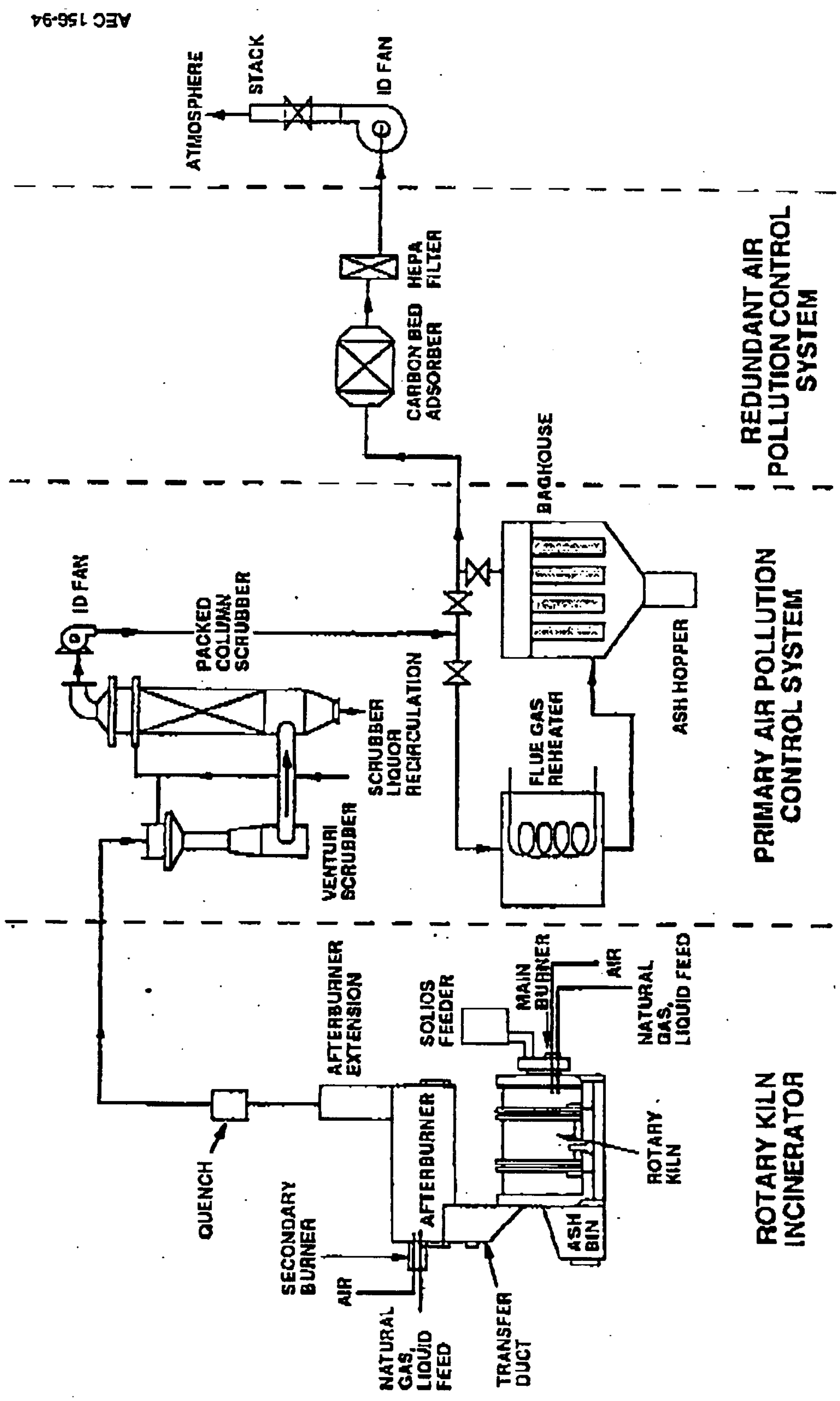

Figure 1. Schematic of the IRF rotary kiln incineration system.

Continuous Emission Monitoring
Total Mercury Analysis

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ABSTRACT

Mercury and its.compounds is emitted from various sources, coal fired power plants and waste incinerators being the prime sources. Various methods for continuous automatic monitoring of Hg° or [Hg° & its compounds] are being used (optical in-situ, extractive with and without sample preparation). The methods are discussed and compared.

The paper also describes an automatic continuous Total mercury Analyzer (HM-1400), which has received Equivalency in Germany. Applications (industrial, hospital, urban, hazardous waste incinerators, waste water sludge incineration) are discussed, as well as field experience from over 7 years.

INTRODUCTION

German and draft European regulations for waste incineration plants require, besides other components, the continuous and automatic monitoring of Total Mercury (i.e. Mercury and its compounds) in the stack gas after the required scrubbing systems. As no field-useable process instruments were available at that time (mid 80's), the Bavarian Association of Hazardous Waste Removal (GSB) in cooperation with the company VEREWA decided to develop an automatic Total Mercury Analyzer. The development of the HM-1400 was concluded in 1988 and instruments are in continuous use since.

The monitoring of Total Mercury in comparison of the monitoring of only mercury vapor (elemental mercury, Hg°) is especially important for the emission control of waste incineration processes, as mercury does exist, due to the nature of the in-homogeneous waste intake and the burning process, in the stack gas in various forms, ranging from elemental mercury (mercury vapor) to gaseous and particulate mercury compounds and to mercury absorbed on particulates. Therefore special focus was given to the point to develop an instrument being capable of monitoring all possible forms of mercury and report this as a summary signal.

Body

Methods of Mercury Monitoring in Emissions

Today, several methods of mercury monitoring are existing and being used in a number of instruments, both commercially available, as still in the R&D stage. The most commonly used method is to utilize either the direct Absorbance of UV light by the mercury atom or the Atomic Fluorescence emitted by the mercury atom after being activated by UV light. The second method has the advantage of being very selective for mercury, however does show, in the presence of oxygen, less sensitivity compared to the direct UV absorbance. Therefore instruments utilizing this detection method usually contain a purge and trap system with a gold trap to both increase the concentration as well as have the mercury vapor present in a gas carrier gas containing an oxygen (f.e. nitrogen or a noble gas like argon). This method is also used in the model 2537A from Tekran Inc, Toronto, for ambient air and background monitoring, as the sensitivity easily can be increased to very low levels by increasing the time for trapping mercury. The Hg° atom amalgamizes with the au° atoms and therefore is retained in the gold trap. Increasing the temperature of the gold trap and purging it with the carrier gas results in the reversed reaction setting free the elemental mercury as a peak. In the detector the mercury atoms absorb UV light emitted from a UV light source resulting in a UV-Fluorescence with the peak intensity at 253.7 nm. The direct use of such a system for stack emission monitoring of Total Mercury is at least questionable, as primarily elemental mercury will go into amalgamation. Therefore a sample preparation step similar to the one described below to transform all mercury compounds into the elemental form is required.

Another method commercially available from the company Opsis, Furulund, Sweden, is the direct in-situ UV-absorption of Hg°, which of course, only allows the monitoring of elemental mercury not taking in account any compounds, particulates, or mercury absorbed on particulates.

To my knowledge, no other methods are presently used or developed to monitor Total Mercury in stack gas from waste incinerators.

Description of a Total Mercury Analyzer with the example of VEREWA's HM-1400:

The instrument consists of a heated sample probe, heated sample transfer line, three step sample preparation, condenser, analyzer with sample gas pump, and calibration system. The individual components and their functions are described as follows:

Heated Sample Probe and heated Sample Transfer Line:
Because of the aggressive nature of the stack gas of waste incinerators (f.e. HCl, HF, SO_2, NO_x), the sample probe should be manufactured using anti-corrosive material, in this case it is made out of titanium. This material, however, forms a very stable amalgam and would be a good filter for mercury. Therefore the titanium probe is internally lined with a PTFE-tube. The probe is heated with a resistance heater, using the probe material itself as resistor. The internal PTFE-tube is an integral part of the flexible, heated transfer line, which consists of the isolation, a support tube with heater, and an exchangeable internal PTFE-tube. This allows the relatively easy cleaning of the heated line. A sample gas filter is not included in the sampling system, as otherwise particulate mercury and mercury adsorbed on particulates would not be included in the signal. Both sample probe and sample line are heated to app. 120°C. The heated line ends in the calibration valve of the analyzer, which is a heated PTFE ball valve.

Three-step sample preparation:
Directly behind the calibration valve, the infrared-heated oven is located, which is the first step for the sample preparation to measure Total Mercury. The temperature of the oven is controlled to 800°C. Internally it consists primarily of a quartz reactor.

Mercury reacts in the stack gas with other components present to form various compounds depending on the composition of the particular stack gas. The low solubility of some inorganic compounds (see table 1) can prohibit a quantitative reduction to elemental mercury in the liquid phase reactor. The thermal pretreatment of the stack gas causes a partial decomposition, sublimation and vaporization of these compounds, in order to make them reduceable by the $NaBH_4$ - solution. The following table shows some of the most important mercury compounds in a typical stack gas.

Formular	Solubility mg/l	Melting point °C	Boiling point °C	Phase transition
$HgCl_2$	6900 (20°C)	276	302	n/a
HgS	0,001 (18°C)	n/a	n/a	S 583,5 °C
Hg_2Cl_2	0,2 (25°C)	n/a	n/a	d 400°C
HgO	5,3 (25°C)	n/a	n/a	d 500°C
Hg_2O	n/a	n/a	n/a	d 100°C
Hg_2CO_3	0,0045 (20°C)	n/a	n/a	d 130°C

Table 1: Physical characteristics of important inorganic mercury compounds* in stack gas. (Abbreviation: n/a not available; S Sublimation; d decomposition to the elements

The IR - Oven works at 800°C (1470°F). This temperature initiates a thermal decomposition as well as an oxidation to Hg^{+0} caused by oxygen. Only this thermal pretreatment and the chemical treatment afterwards allow a detection of total mercury.

Downstream the outlet of the oven the wet-chemistry sample preparation steps no. 2 and 3 take place. A chemical treatment of the stack gas is essential, of total mercury should be detected. The chemical treatment works in two steps. First 1 molar HCl is mixed with sample gas and 1% $NaBH_4$ solution is added to reduce mercury compounds to elemental mercury.

The hydrochloric acid works in two ways for the stack gas treatment: First to collect dust particles in the aqueous solution and second to set free the redox potential of $NaBH_4$. The reduction of mercury compounds to Hg° is optimized at a pH between 0 and 1.

12. partial oxidation of mercury with oxygen in the presence of HCl:

$$Hg + ½O_2 + 2HCl \Leftrightarrow HgCl_2 + H_2O$$

– The mercury ions will be reduced by $NaBH_4$ to Hg° stripped out of the liquid phase with the gas stream and then detected in a UV photometer:

$$4NaBH_4 + 2HCl + 6H_2O + HgCl_2 \leftrightarrow 4B(OH)_3 + 9H_2 + 4NaCl + Hg\uparrow$$

The liquid chemical waste consist of an acidic solution including the non-toxic salts NaCl and $B(OH)_9$. This solution can be passed to any wastewater line of the laboratory.

Downstream of the wet chemistry sample preparation module the condenser is located, cooling the sample gas to app. 1°C. The condensate (mixture between stack gas condensate and used reagents) is extracted with a peristaltic pump to the drain (either into a container or directly to the facility's sewage treatment plant. The gas leaving the condenser therefore by definition is dry, the signal of the HM-1400 is already on "dry basis".

After passing the sample preparation reactors and the condenser, all mercury has been reduced to the elemental form Hg°, showing a vapor pressure under these temperature conditions of app. 1,500 µg/m3. Therefore it can be expected to find the mercury completely in the vapor phase and not to loose any to the drain. Analysis done at University of Duisburg showed no detectable concentrations of mercury in the condensate.

Mercury Vapor Detector:
As detector a dual-beam UV-Photometer is used. This treatment is available as portable TLV-level sensor by the Dutch company EPM, and was modified to be used as continuous detector in the HM-1400. The Detector module consists of one UV-source, two cuvettes, two detectors, and an iodized-charcoal filter. The sample gas first flows through the measuring cuvette, where all components absorbing UV-light of 253.7 nm do absorb. These components, besides others, include mercury, aromatic hydrocarbons, water, and SO_2. After passing the measuring cuvette, the sample gas flows through the zero-filter consisting of a tube filled with iodized charcoal, selectively and completely adsorbing mercury vapor. Other UV-sensitive components present are not to any significant amount adsorbed. Following the zero-filter is the reference cuvette located, where only the remaining UV-absorbing components still absorb. The difference between the two signals is directly related to the mercury concentration. The two cuvettes do see the same gas, therefore influences by changing concentration of other UV-absorbing components than mercury do not give an interference.
The results of the interference test carried out during the German Equivalency Approval of the HM-1400 is as follows:

Component	Concentration	Carrier gas	Hg° - concentration (µg/m^3)	Deviation (% FS) (FS = 150 µg/m^3)
CO2	15 VoL-% 15 VoL-%	N_2 N_2	0 65	< 1.0 < 1.0
CO	484 mg/m^3 484 mg/m^3	N_2 N_2	0 64	< 1.0 < 1.0

NO	496 mg/m^3 496 mg/m^3	N_2 N_2	0 66	< 1.0 - 1.1
NO_2	150 mg/m^3 150 mg/m^3	N_2 N_2	0 87	< 1.0 - 1.2
HCl	180 mg/m^3 180 mg/m^3	N_2 N_2	0 66	< 1.0 < 1.0
SO_2	200 mg/m^3 200 mg/m^3	N_2 N_2	0 95	< 1.0 < 1.0
NH_3	20.0 mg/m^3 20.0 mg/m^3	N_2 N_2	0 113	< 1.0 < 1.0
N_2O	20.0 mg/m^3 20.0 mg/m^3	N_2 N_2	0 113	< 1.0 < 1.0
H_2O	30 VoL-% 30 VoL-%	N_2 N_2	0 101	< 1.0 < 1.0
CH_4	50.0 mg/m^3 50.0 mg/m^3	N_2 N_2	0 116	< 1.0 < 1.0
N-Butane	43.6 mg/m^3 43.6 mg/m^3	N_2 N_2	0 67	< 1 + 1.0
Benzene	1.08 mg/m^3 1.08 mg/m^3	N_2 N_2	0 65	<1 <1

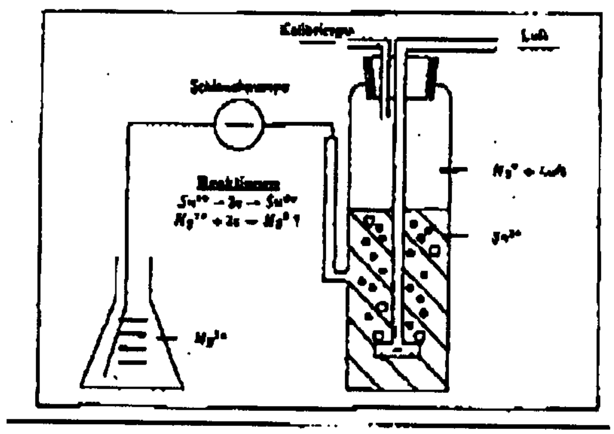
The only measurable and significant interference was against SO_2 > 500 mg/m^3, as the Hg peak sits on the slope of a huge SO_2 peak in the UV. However, SO_2 concentrations of this magnitude are more than unlikely to be present after the sufficient scrubbing systems for the adsorbance of Mercury, Dioxins and Furans. The tests were carried out using the entire analyzer system consisting of sample probe, heated line, hot and chemical reactors, condenser, and analyzer.

Calibration:

The zero calibration and correction is done automatically by the analyzer in user selectable time sequence and length. Default setting is a zero offset every six hours with a total time consumption of six minutes. During zero and span calibration no sample gas is taken from the source. Zero gas is produced by scrubbing any mercury from ambient air in a zero filter filled with iodized charcoal. Zero gas is introduced to the analyzer upstream the heated oven through a heated PTFE Ball Valve.

Hg span gas is not available (at least not very stable and not in the required concentration) in gas cylinders. Therefore a calibration module was developed which allows the user to produce in the analyzer Hg° calibration gas in the required concentration. This calibration module gives the change of both testing the analyzer for leaks as well as calibrating the Photometer. A Hg^{2+} calibration solution (usually $Hg(NO_3)_2$) is flushed into a wash bottle filled with app. 100 ml $SnCl_2$-solution (50 g/l). The Hg^{2+} is reduced completely to Hg°, which is purged into the analyzer by the zero gas.

The theoretical value of µg/m^3 Hg is automatically calculated based on the concentration of Hg^{2+} (manual input), the peristaltic pump's flowrate, zero gas flowrate, actual pressure and temperature. The figure shows the principal design of the calibration unit.



Schematic Design of the HM-1400's Calibration Module

The experience shows, that the span gas calibration and span adjustment is necessary about every three to six months only.

Conclusions

The Total Mercury Analyzer HM-1400 of VEREWA proved to be a very efficient tool for automatic and continuous analysis of mercury, its compounds, and mercury adsorbed on particulates. Development and fine-tuning to the requirements of monitoring in stack gas down to one ppb took quite some time, but we should not oversee, that we detect approximately the equivalent of one American person in all of India! The use of an instrument for monitoring Total Mercury Concentrations in the emission from incineration processes does give the opportunity of not only compliance monitoring, but also to control and optimize the efficiency of the scrubbers and therefore is an important tool for the protection of the environment.

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3. TÜV-Bericht Nr.: 936/803002/LAB2, TÜV Rheinland
4. TÜV-Bericht Nr.: 936/803002, TÜV Rheinland, Cologne, 29.02.1996

CEM2.055(205)(b) TCC member companies would like to further discuss this issue with EPA and potentially offer some of our sites for such testing.

CEM3.028(205)(b) TCC member companies would like to further discuss this issue with EPA and potentially offer some of our sites for such testing.

CEM4.030(205)(b) TCC member companies would like to further discuss this issue with EPA and potentially offer some of our sites for such testing.

RCSP-182 (1) 4. Dow suggests EPA adopt a more flexible approach to CEM testing, taking into account historical calibration performance. Dow believes that EPA has proposed an unnecessarily high frequency of calibration testing which can be modified, yet assure adequate calibration of these instruments. First, as a matter of practicality, EPA must utilize testing approaches which gather enough information on stack instruments without going overboard and collecting it for the sake of collecting it. Dow recommends EPA incorporate the approach used by Germany for certification of stack instrumentation. Dow strongly suggests that EPA consider decreasing the QA frequency as repeated testing assures that calibration of the CEM is not changing. It is also suggested that a certification of CEMS be considered that incorporates a combination of laboratory and on-site certification similar to the German TUV Certification Process. Table E-1 below summarizes recommended frequencies and information needs for this type of testing.

Table E-1. Suggested CEM Testing Frequencies
(section of Table pertaining to CMS deleted here, but appears in other place)

Instrument	**Quality Control**	**Quality Assurance**	
		Test Type	Frequency
CEMs			
Multi-metals	Written Protocol	RATA	Each time a Performance Test is Conducted
		ACA	Once per year [11]
PM	Written Protocol	RCA	Once per 18 months
		ACA	Once per 3 months [12]
Hg	Written Protocol	RATA	Each time a Performance Test is Conducted
		ACA	Once per 3 months [13]
HCl, Cl2, CO, O2, THC	Written Protocols	RATA	Once per year
		ACA	once per 3 months [14]

[Footnote 11: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to once every two years.]

[Footnote 12: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to annually if such performance is consistent.]

[Footnote 13: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to annually if such performance is consistent.]

[Footnote 14: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to annually if such performance is consistent.]

<u>Comment Summary</u>

Commenters supported EPA's effort to field test PM and Hg CEMS before making the decision to require them and showed a willingness to help. They also referenced earlier studies by EPA and others.

Response

EPA completed its demonstration tests of Hg and PM CEMS. The earlier tests mentioned by commenters greatly influenced the scope of these tests. See the December 30, 1997, Notice of Data Availability for more information on these tests.

14. Timeframe for Installing CMS

Comment

CEM1.077(183) Implementation of Continuous Monitoring System Requirements Within 6 Months 3M understands EPA's desire to have all HWCs and BIFs follow the same operating procedures. However, 3M is concerned that the six month time frame is probably not realistic. New instruments may have to be purchased (deliver times can exceed six months i.e., a mass flowmeter that is made out of Hastelloy C). Next, several hundred equations handling analogue inputs to the process control computer, per unit, must be reprogrammed to alarm and then be incorporated into an AWFCO alarm equation. Many facilities will need more computer capacity to store the calculations and handle the alarm displays related to each alarm. The process computers used for this often take several months for delivery. After delivery, they must be installed and tested. Finally, before the actual changes can be implemented, the entire set of revisions must be reviewed by an internal safety and process control committee to assure the changes are consistent with OSHA and company safety and burner management [1] requirements.

[Footnote 1: Burner management deals with the safe management and operation of direct fired devices like incinerators and boilers. Burner management primarily deals with how to prevent uncontrolled fires or explosions. Reviews are conducted for any significant process change at a combustor by evaluating feed system interlocks and shutoffs, flame sensing, assuring proper air-to-fuel ratios, maintaining a source of ignition and the design aspects of the burners and combustion equipment. The burner management must be successfully passed before new process changes can be implemented.]

Given these engineering and safety constraints, 3M feels that six months is insufficient to implement these systems. 3M suggests that a facility be required to comply at the same time that it must comply with appropriate new emissions standards. This will enable facilities to make one set of process control changes, with all the new equipment in place, rather than make one set of process changes within six months and a second set of changes when compliance with the remaining provisions of the new regulations is required.

Comment Summary

The commenter stated that more than six months was needed to implement CMS.

Response

The Agency has been unable to make a decision on this matter at this time.

15. 15-second CEMS Measurements

Comment

CEM9.001(114) Currently Performance Specifications found in 40 CFR 60 Appendix B and Quality Assurance Procedures in Appendix F are applicable to other air emission sources. Specification 4A of Appendix B for Carbon Monoxide Continuous Monitoring Systems refers to 40 CFR 60.13 which specifies a minimum cycle of operation of one cycle (sampling, analyzing, and data recording) for each successive 15-minute period. This section also specifies that all continuously monitored parameters other than opacity shall be 1-hour averages computed from four or more data points equally spaced over each 1-hour period. Data recorded during continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages. The proposed rule is more, stringent, specifying that rolling averages be based on some (specified) time period, calculated every minute from a one-minute average of four measurements taken at 15-second intervals.

CEM9.002(114)(b) Further, it was recommended that 40 CFR 60, including 60.13 "Monitoring requirements," and Appendices B and F be utilized as a working base for the state regulations. This approach extended the concepts of the Clean Air Act rather than RCRA and therefore recognized that cycle time/response time of 15 seconds is or should not be applicable to most CEM parameters. It also recognized the need for establishing minimum data availability on CEM data for an incinerator operation in a similar manner to that applied to other air emission sources.

Comment Summary

Commenters believe EPA should not require that CEMS measurement be made every 15 seconds.

Response

EPA agrees that making measurements at 15 second intervals is inconsistent with what occurs in other Air rules. However, it is consistent with standard practices for this industry since the BIF and incinerator rules require such frequent monitoring. For simplicity, we believe it is better to maintain the 15 second requirement rather than impose different requirements at the same source.

EPA agrees that data availability requirements need to be defined for CEMS. The reader is referred to issue 3 of this section of the Response to Comments Document for more discussion on data availability.

Total Mercury CEMS

1. Hg CEMS Requirement

Comment

CEM2.001(083) 12 pg 17427, column 2 - states that incinerators must add a mercury CEMS and states that it is made by a German company called Verewa. I feel that it is wrong to create new regulations that require facilities to add new equipment that 1) isn't made by any company in the USA, and 2) is only available from one company. I feel that any equipment made by such a small number of companies, must not be a proven technology yet. In addition, the ability of an entire industry to comply with this new rule would hinge on the business decisions of these one or two companies. If that company decides to stop making the equipment, alters its design, does not provide after the sale customer support, etc., then the entire Hazardous Waste Combustor industry could become non-compliant. It is not appropriate to create rules where one or two equipment manufacturers can drive/control a rule making. While you may have good intentions when specifying state of the art equipment, it is not appropriate to mandate an entire industry to use such equipment. This rule needs to specify equipment which is commonly available, proven technology that is available in the USA from numerous suppliers.

CEM2.002(083) 13 pg 17427, column 3 - the EPA invited comments on allowing small on-site sources to obtain a waiver from the requirement of installing Hg CEMS. We feel that the alternatives to a CEMS that are described in the proposed rule are actually more likely to ensure that you do not exceed prescribed emissions limits that CEMS. It is our opinion that CEMS really only monitor and document the emission exceedance, but do nothing to keep it from happening. Therefore we support the concept of using operating limits in lieu of requiring CEMS for small on-site sources.

CEM2.005(b) Systems for continuous monitoring of mercury emissions also are commercially available in the U.S.

CEM2.007(b) 1 . EPA Lacks a Valid Technical or Legal Basis for Its Proposal to Require Mercury CEMs

EPA has proposed to require hazardous waste combustors to use CEMS to demonstrate compliance with the mercury emissions standard. 61 Fed. Reg. at 17,520 (proposed 40 C.F.R. § 63.1210(a)). EPA's proposed mercury CEMS requirement is unsupportable because such devices generally are not commercially available and/or have not been demonstrated to be reliable. Indeed, EPA to date has not required the use of CEMS to monitor mercury emissions, based on its view that such a monitoring approach was not feasible. In a concurrent rulemaking-the proposed Maximum Achievable Control Technology ("MACT") rule for medical waste incinerators ("MWI") -- EPA stated unequivocally that mercury emissions cannot be measured using a CEMS. 60 Fed. Reg. 10,654, 10,682 (Feb. 27, 1995). In a recent Federal Register notice reopening the comment period on the MWI MACT proposal, the Agency stated that it is leaning towards promulgation of an emissions testing and monitoring option for MWIs that would not require CEMS for any emissions parameters (including those parameters for which CEMS are demonstrated and available (i.e., CO, O_2.)), out of concern that the costs associated with CEMS would exceed the costs of the emission control -systems needed to achieve the proposed MWI emissions standards. 61 Fed Reg.) 1,736, 31,750 (June 20, 1996). EPA in other MACT rules has also concluded that "CEMS are not available [for] Hg [mercury]." See, e.g., 59 Fed. Reg. 48,198, 48,218 (Sept. 20, 1994) (proposed municipal waste combustor ("MWC") MACT rule). In light of these findings, it would be arbitrary and capacious for EPA to require hazardous waste combustors to install mercury CEMS.

Notably, EPA's Draft Technical Support Document (RCSP-SO053) for this rulemaking does not support the imposition of a mercury CEMS requirement for hazardous waste combustors. On the contrary, that document compels the conclusion that mercury CEMS are not commercially available and have not been adequately field-tested.

In the Draft Technical Support Document, EPA describes 5 different CEMS for mercury, representing four devices designed to measure total mercury emissions, and one device that measures only gas-phase elemental mercury (and therefore is not suitable for demonstrating compliance with the proposed mercury emissions standard). Tech. Supp. Doc, Vol. IV, at 2-17 to 2-22. Three of the four total mercury monitors are characterized by EPA as being not commercially available or extensively field tested. Id. at 2-19 to 2-20. The fourth total mercury monitor is described by the Agency as being commercially available. EPA admits, however, that a device "has not been demonstrated in the U.S." and is "currently undergoing field trials in Germany." Id. at 2-18.

In short, EPA's proposal to require hazardous waste combustion facilities to install mercury CEMS rests not on a concrete evaluation of the performance of well-demonstrated and available technology, but rather on the Agency's hopeful assessment that such devices "appear to be feasible and will be available soon." Id. at 2-21. Although EPA purports to be planning field tests "to ensure the successful application of these monitors to emission monitoring for compliance on hazardous waste burning facilities," id. at 2-22, those tests were only in the planning stages at the time that the proposed combustion rule was issued by EPA. See 61 Fed. Reg. 7232 (Feb. 27, 1996) (soliciting vendor proposals for mercury and PM CEMS demonstration project). Given that EPA's field tests were projected to begin in May 1996 and continue for 6 months to one year, it is evident that the results of those tests will not be available prior to the August 19, 1996 deadline for submitting comments on the proposed rule, and may not even be available prior to the current December 1996 deadline for issuance of the final rule.

Under these circumstances, EPA lacks a valid technical or legal basis for its proposal to require hazardous waste combustion facilities to install and operate mercury CEMS. See Citizens for Clean Air v. EPA, 959 F.2d 83 91 846-48 (Cir. 1992) (to be considered "available" for purposes of the Clean Air Act, a technology must be adequately demonstrated). As such, its proposal to require mercury CEMS is arbitrary and capricious. In fact, in other Clean Air Act rulemakings, EPA has cited the lack of field-testing as a basis for not allowing the regulated community to use certain CEMS technologies. See 58 Fed. Reg. 3590, 3644 (Jan. 11, 1993) (denying commenters' request that EPA allow the use of certain alternative monitoring systems for demonstrating compliance with NO_x emissions standards under acid rain program). EPA instead should allow hazardous waste combustion facilities to continue to use other existing, proven compliance methods. At a minimum. EPA cannot properly require hazardous waste combustors to install and operate mercury CEMS until such time that its ongoing CEMS field tests are completed and the results of those tests are made available for public comment in accordance with the Administrative Procedure Act.

CEM2.009(101)(d) Mercury CEM should be optional, like SVM and LVM;

CEM2.009(101)(e) 3. Mercury R-P does not believe that a reliable mercury CEM is commercially available. The CEM subcommittee of the American Society of Mechanical Engineers Research Committee on Industrial and Municipal Wastes has been conducting periodic meetings of CEM developers and interested technical experts to monitor development of multi-metal CEMS. Although several devices have shown promising results, no proven unit is likely to be commercially available for some time.

Therefore, EPA must not require use of Hg CEMS, but must allow operators the flexibility to choose between CEMs or operating parameter limits to ensure compliance with MACT emission limits (17427/2).

CEM2.011(106)(a) 3. Mercury EPA should not require use of MM or Hg CEMS, but must allow operators the flexibility to choose between CEMs or operating parameter limits to ensure compliance with MACT emission limits (17427/2).

ENSCO does not believe that a reliable and affordable mercury CEM is commercially available. Even if one unit is eventually made available, the emerging nature of this technology will dictate numerous start-up problems when these units are installed on full scale processes for the first time. It may be several years before a mercury CEM is perfected to the degree that it can produce as reliable and routine readings as exist now for CO and HCs.

CEM2.011(106)(b) We urge EPA to allow feed stream monitoring as an option to CEMS, and not mandate mercury CEMS.

CEM2.012(111) Availability of Hg and PM CEMs and ASME Work on CEMs A mercury continuous emission monitor ("CEM") is purportedly available in Europe but incinerator personnel reported that no mercury CEM was being used in several incinerators in Germany visited in early 1996.

CEM2.017(114)(b) The survey of Hg CEM vendors revealed six manufacturers of instruments that could be considered as potentially available to meet the requirements of the proposed rule. One of these (PSI) is still a prototype unit and another (ADA) is still under development. Four of these units meet EPA's definition of a continuous monitor, two are able to measure particulate-bound mercury, and three of the units are affected by high levels of SO_2. The two units that appear closest to application under the proposed rule (HM 1400 and Hg-Mat 2) are being utilized extensively in Europe, but can generate as much as 40 liters of waste reagent each month. The six users of Hg CEMs were all German companies using either the PM 1400 or Hg-Mat 2 units. In general, these users did not offer any negative information concerning their experiences with these instruments.

CEM2.020(118) iii. Compliance With the Mercury Standard Should Be Demonstrated By Establishing Operating Parameters Not by the Use of CEMS

Allied Signal supports EPA's proposal to demonstrate compliance with the mercury standard through the establishment of operating parameters rather than using CEMS. EPA's survey of mercury CEMS states that several technologies for the measurement of total mercury appear to be feasible and may be available soon, however, it further notes that little field testing of mercury CEMS has taken place. In fact, EPA has concluded that "A demonstration program with field testing of the CEMS against EPA reference methods will be required in this country in order to ensure the successful application of these monitors to emission monitoring for compliance on hazardous waste burning facilities." Allied Signal agrees with EPA's conclusion, and, therefore, recommends that the optional requirement to install mercury CEMS should be removed from the proposed regulations.

CEM2.021(122) 3. Mercury CEMs not necessary for facilities with low Hg in feed streams. Again, feed stream analysis and feed rate controls limits the Hg that can be emitted at many facilities. A waiver for Hg CEMs is needed for those facilities who can demonstrate that feed rate controls will limit Hg exposures to acceptable levels. - Hg analyzers are not proven technology and add unnecessary capital and operating cost to the facility, while decreasing the operating reliability. Malfunction of Hg CEMs could lead to unnecessary public exposure due to unnecessary waste feed cutoffs.

CEM2.023(124) 5.II.C.3.a Evaluation of Monitoring Options 1.Several types of CEMS are available which measure Hg. EPA proposes the use of a Hg CEMS to document compliance with the Hg standard (61 FR 17426-17428).

DOE believes that the Hg emission limit is excessively restrictive and that facilities will need to impose a feed rate limit on Hg to ensure compliance, regardless of whether or not the facility employs a Hg CEMS on the stack. Therefore, it would follow that a Hg stack CEMS would become redundant DOE suggests that EPA investigate this matter further and consider establishing a less restrictive Hg limit.

2. EPA states that incinerators must add a mercury CEMS and states that one is made by a German company called Verewa (61 FR 17427, col. 2).

DOE questions the appropriateness of crafting regulations that require facilities to add monitoring equipment that 1) is made outside the USA , and 2) appears to be a offered by a limited number of companies. DOE suggests EPA evaluate other RCRA uses of the term "available" such as under the land disposal restriction program.

5.II.C.3.d. Alterative to CEMS

As an alternative to a CEMS, if the final rule does not require that Hg emissions be continuously monitored, the rule would ensure compliance by establishing limit on the operating parameters(61 FR 17428)

DOE supports the use of operating limits in lieu of requiring CEMS. In fact, DOE believes that the alternatives to CEMS that are described in the proposed rule are actually more likely to ensure that emission limits are not exceeded.

CEM2.024(128)(c) 1. EPA lacks a valid technical or legal basis for its proposal to require mercury

CEMS.

EPA has proposed to require hazardous waste combustors to use CEMS to demonstrate compliance with the mercury emissions standard. 17520 (proposed 40 C.F.R. § 63.1210(a)). EPA's proposed mercury CEMS requirement is insupportable because such devices generally are not commercially available and/or have not been demonstrated to be reliable. Indeed, EPA to date has not required the use of CEMS to monitor mercury emissions, based on its view that such a monitoring approach was not feasible. In a concurrent rulemaking - the proposed Maximum Achievable Control Technology ("MACT") rule for medical waste incinerators ("MWI") - EPA stated unequivocally that "mercury emissions cannot be measured using a CEMS." 60 Fed. Reg. 10682 (Feb. 27,1995). In a recent Federal Register notice reopening the comment period on the MWI MACT proposal, the Agency stated that it is leaning towards promulgation of an emissions testing and monitoring option for HWIs that would not require CEMS for any emissions parameters (including those parameters for which CEMS are demonstrated and available (i.e., CO, O_2.)), out of concern that the costs associated with CEMS would exceed the costs of the emission control systems needed to achieve the proposed MWI emissions standards. 61 Fed. Reg. 31750 (June 20,1996). EPA in other MACT rules has also concluded that "CEMS are not available [for] Hg [mercury]." See, e.g., 59 Fed. Reg. 48218 (Sept. 20,1994) (proposed municipal waste combustor ("MWC") MACT rule). In light of these findings, it would be arbitrary and capacious for EPA to require hazardous waste combustors to install mercury CEMS.

Notably, EPA's Draft Technical Support Document (RCSP-SO053) for this rulemaking does not support the imposition of a mercury CEMS requirement for hazardous waste combustors. On the contrary, that document compels the conclusion that mercury CEMS are not commercially available and have not been adequately field-tested. In the Draft Technical Support Document, EPA describes five different CEMS for mercury, representing four devices designed to measure total mercury emissions, and one device that measures only gas-phase elemental mercury (and therefore is not suitable for demonstrating compliance with the proposed mercury emissions standard). Tech. Supp. Doc, Vol. IV, at 2-17 to 2-22. Three of the four total mercury monitors are characterized by EPA as being "not commercially available or extensively field tested." Id. at 2-19 to 2-20. The fourth total mercury monitor is described by the Agency as being commercially available. EPA admits, however, that this device "has not been demonstrated in the U.S." and is "currently undergoing field trials in Germany." Id. at 2-18.

In short, EPA's proposal to require hazardous waste combustion facilities to install mercury CEMS rests not on a concrete evaluation of the performance of well-demonstrated and available technology, but rather on the Agency's hopeful assessment that such devices "appear to be feasible and will be available soon." Id. at 2-21. Although EPA purports to be planning field tests "to ensure the successful application of these monitors to emission monitoring for compliance on hazardous waste burning facilities," id. at 2-22, those tests were only in the planning stages at the time that the proposed combustion rule was issued by EPA. See 61 Fed. Reg. 7232 (Feb. 27, 1996) (soliciting vendor proposals for mercury and PM CEMS demonstration project). Given that EPA's field. tests were projected to begin in May 1996 and continue for 6 months to one year, it is evident that the results of those tests will not be available prior to the August 19,1996 deadline for submitting comments on the proposed rule, and may not even be available prior to the current December 1996 deadline for issuance of the final rule.

Under these circumstances, EPA lacks a valid technical or legal basis for its proposal to require hazardous waste combustion facilities to install and operate mercury CEMS. See Citizens for Clean Air v. EPA, 959 F.2d 839, 846-48 (9th Cir. 1992) (to be considered "available" for purposes of the Clean Air Act, a technology must be adequately demonstrated). As such, its proposal to require mercury CEMS is arbitrary and capricious. In fact, in other Clean Air Act rulemakings, EPA has cited the lack of field-testing as a basis for not allowing the regulated community to use certain CEMS technologies. See 58 Fed. Reg. 3590, 3644 (Jan. 11, 1993) (denying commenters' request that EPA allow the use of certain alternative monitoring systems for demonstrating compliance with NOx emissions standards under acid rain program). EPA instead should allow hazardous waste combustion facilities to continue to use other existing, proven compliance methods. At a minimum, EPA cannot properly require hazardous waste combustors to install and operate mercury CEMS until such time that its ongoing, CEMS field tests are completed and the results of those tests are made available for public comment in accordance with the Administrative Procedure Act.

CEM2.028(130)(b) The ETC does not believe that a reliable and affordable mercury CEM is commercially available. In the proposed rule, EPA refers to a mercury CEM that supposedly is available in Europe, but an ETC member company's personnel visited Germany in early 1996 and found that no mercury CEMs were being used at any commercial incinerators. Even if one unit is eventually made available, the emerging nature of this technology will dictate numerous start-up problems when these units are installed on full scale processes for the first time. It may be several years before a mercury CEM is perfected to the degree that it can produce as reliable and routine readings as exist now for CO and HCs.

CEM2.028(130)(c) The ETC supports the other controls [operating parameter limits for Hg] proposed by EPA in this section of the rule for control of mercury emissions.

CEM2.031(141)(b) a. EPA Lacks a Valid Technical or Legal Basis for Its Proposal to Require Hazardous Waste Combustion Facilities to lmtau and Operate Mercury CEMS

EPA has proposed to require hazardous waste combustors to use CEMS to demonstrate compliance with the mercury emissions standard. 61 Fed. Reg., at 17,520 (proposed 40 C.F.R. 63.1210(a)). EPA's proposed mercury CEMS requirement is insupportable because such devices generally are not commercially available and/or have not been demonstrated to be reliable. Indeed, EPA to date has not required the use of CEMS to monitor mercury emissions, based on its view that such a monitoring approach was not feasible. In a concurrent rulemaking -- the proposed Maximum Achievable Control Technology ("MACT") rule for medical waste incinerators ("MWI") -- EPA stated unequivocally that "mercury emissions cannot be measured using a CEMS." 60 Fed. Reg. 10,654, 10,682 (Feb. 27, 1995). In a recent Federal Register notice reopening the comment period on the MWI MACT proposal, the Agency stated that it is leaning towards promulgation of an emissions testing and monitoring option for MWIs that would not require CEMS for my emissions parameters (including those parameters for which CEMS are demonstrated and available (i.e., CO,O_2)), out of concern that the costs associated with CEMS would exceed the costs of the emission control systems needed to achieve the proposed MWI emissions standards. 61 Fed. Reg. 31,736, 31,750 (June 20, 1996). EPA in other MACT rules has also concluded that "CEMS are not available (for] Hg [mercury]." See, e.g., 59 Fed. Reg. 48,198, 48,218 (Sept. 20, 1994) (proposed municipal waste combustor ("MWC") MACT rule). In light of these findings, it would be arbitrary and capricious for EPA to require hazardous waste combustors to install mercury CEMS.

Notably, EPA's Draft Technical Support Document (RCSP-SO053) for this rulemaking does not support the imposition of a mercury CEMS requirement for hazardous waste combustors. On the contrary, that document compels the conclusion that mercury CEMS are not commercially available and have not been adequately field-tested.

In the Draft Technical Support Document, EPA describes 5 different CEMS for mercury, representing four devices designed to measure total mercury emissions, and one device that measures only gas-phase elemental mercury (and therefore is not suitable for demonstrating compliance with the proposed mercury emissions standard). Tech. Supp. Doc.. Vol. IV, at 2-17 to 2-22. Three of the four total mercury monitors are characterized by EPA as being not commercially available or extensively field tested. Id. at 2-19 to 2-20. The fourth total mercury monitor is described the Agency as being commercially available. EPA admits, however, that this device "has not been demonstrated in the U.S." and is "currently undergoing field trials in Germany." Id. at 2-18.

In short, EPA's proposal to require hazardous waste combustion facilities to install mercury CEMS rests not on a concrete evaluation of the performance of well-demonstrated and available technology, but rather on the Agency's hopeful assessment that such devices appear to be feasible and will be available soon. Id. at 2-21. Although EPA purports to be planning field-tests "to ensure the successful application of these monitors to emission monitoring for compliance on hazardous waste burning facilities," Id. at 2-22, those tests were only in the planning stages at the time that the proposed combustion rule was issued by EPA. See 61 Fed. Reg. 7232 (Feb. 27, 1996) (soliciting vendor proposals for mercury and PM CEMS demonstration project). Given that EPA's field tests were projected to begin in May 1996 and continue for 6 months to one year, it is evident that the results of those tests will not be available prior to the August 19, 1996 deadline for submitting comments on the proposed rule, and may not even be available prior to the current December 1996 deadline for issuance of the final rule.

Under these circumstances, EPA lacks a valid technical or legal basis for its proposal to require hazardous waste combustion facilities to install and operate mercury CEMS. See Citizens for Clean Air v. EPA, 959 F.2d 839, 846-48 (9th Cir. 1992) (to be considered "available" for purposes of the Clean Air Act, a technology must be adequately demonstrated). As such, its proposal to require mercury CEMS is arbitrary and capricious. In fact, in other Clean Air Act rulemakings, EPA has cited the lack of field- testing as a basis for not allowing the regulated community to use certain CEMS technologies. See 58 Fed. Reg. 3590, 3644 (Jan. 11, 1993) (denying commenters request that EPA allow the use of certain alternative monitoring systems for demonstrating compliance with NOx emissions standards under acid rain program). EPA instead should allow hazardous waste combustion facilities to continue to use other existing, proven compliance methods. At a minimum, EPA cannot properly require hazardous waste combustors to install and operate mercury CEMS until such time that its ongoing CEMS field tests are completed and the results of those tests are made available for public comment in accordance with the Administrative Procedure Act.[Footnote25: Lilly notes that, as discussed above, even if CEMS were demonstrated technology, current monitoring techniques used on hazardous waste incinerators give an adequate demonstration of compliance, and thus CEMS are not necessary.]

CEM2.032(142) D. The Agency Should Reduce Reliance on CEMS Where They Have Been Found to Be Unnecessary. As discussed above, the Agency should eliminate the requirement for a Hg CEM in situations where there is found to be low, or non-detectable, mercury in waste feed streams. Hg CEMS have not yet emerged as proven technology, and they add capital and operating costs to a facility, while decreasing operating reliability. (It should be noted that malfunction of Hg CEMS could in fact lead to unnecessary exposures due to unnecessary waste feed cutoffs.)

CEM2.036(143) 1.0 Mercury CEM There should be a distinction made here between the monitoring of a pollutant and the control of a pollutant. Continuous emissions monitor systems (CEMS) do not control the emissions of a pollutant. Indeed, monitoring in some form and frequency is the first step to controlling emissions, but monitoring alone does not affect emissions. Continuous emissions monitoring does not contribute to emissions control, but serves only as a "policing" function; continuous oversight where no oversight is needed or justified. On the other hand, controlling emissions does not require CEMS. The BIF regulation has done very well in controlling metals emissions without the use of CEMS.

Unlike the monitoring of total hydrocarbons and carbon monoxide emissions, which EPA has linked to the proper operation of a combustion device, (although here again the EPA knows that the THC and CO in cement kiln stack emissions have little or nothing to do with illustrating the combustion conditions in the combustion zone, FR17397) mercury is neither created nor destroyed during combustion. Hence, the use of a mercury CEM on a combustion device that makes no attempt nor has a need to control mercury emissions serves no purpose but that of omnipresent oversight. To put it another way, if a particular kiln currently does not have mercury emissions that exceed the proposed standard and is able, through currently applied technology, to demonstrate that they have the ability to maintain this condition what justification can be offered to require a mercury CEM?

As an example, such a scenario can be demonstrated for Continental Cement Company. In February, 1996, Continental conducted the first phase of their Trial burn test. (GCI managed this test.) Part of this testing included metal emissions determination. Using Method 29, while operating at maximum BIF operating conditions, Continental demonstrated mercury emission rates of 5.99 μg/dscm, 12.6 μg/dscm and 13.7 μg/dscm (corrected to 7% O_2) for each of the three runs. Clearly, these emission rates are well below the proposed standard of 50 μg/dscm. In addition to these documented emission values, Continental also conducted a process sample analysis which documents a maximum mercury input rate of 0. 16 grams per minute which, if there were no retention of mercury within the system, would calculate to an emission rate of 45 μg/dscm, also below the proposed standard. Clearly, based on this test conducted at worst operating conditions, Continental does not have a mercury emission "problem." Furthermore, Continental has demonstrated that they possess and routinely use data from the analytical an analysis of the kiln feed components (raw feed, coal, and hazardous waste fuels) to limit the input of mercury, and all of the other metals regulated under the BIF regulation, to preclude emitting these metals at rates in excess of the health-based criteria specified by the BIF regulation. Continental has made the following demonstration:

1) Mercury emissions at Continental are well below the proposed standard.
2) Mercury input to the kiln system during this same test was insufficient to cause the kiln exhaust to exceed the proposed standard.
3) Continental has demonstrated the ability to analyze and control the input of mercury (and all

other BIF metals).

We fail to understand the purported need to install and maintain at enormous expense, not only in terms of dollars but in terms of potential increased risk to the human health and environment, a mercury CEM.

Indeed, the proposed regulation allows a facility to control mercury emissions via feed rate limits alone and without the requirements to install a mercury CEMs, 63.12 1 0(a)(3). However, this waiver does not allow for the system removal efficiency (SRE) that the individual kiln system achieves for mercury. The facility should be allowed to apply such a SRE when calculating a mercury emission rate from one. Additionally the lower analytical detection limit for the various kiln feeds may not be sufficiently low to demonstrate that the mercury input would not exceed the allowable emission rate as required by the waiver. Taken together, these requirements virtually preclude a cement kiln from utilizing the waiver from the installation of a mercury CEM. The net effect is the forced installation of a mercury CEM with all the attendant risks to human health and the environment as noted above, with no possible reduction in mercury emissions.

What then is the purpose of a CEM if the emission being monitored does not exceed or approach the proposed standard? What environmental and human health benefit is gained in such an instance? What are the environmental and human health negative-impact from requiring, such unneeded monitoring? In the case of a mercury CEM, such negative environmental and human health impacts would be substantial. The manufacturing, transportation, installation and maintenance of such a device have real impact on the environment and human health. The performance specification (PS 12), as proposed, requires that a gas containing mercury be injected into the analyzer each day, and each quarter all to measure emissions that have not been exceeded.

Clearly, EPA's requirement that cement plants install, operate, and maintain a mercury CEM as detailed in the performance specification will without doubt or argument increase the mercury emissions from many facilities, while at the same time entail unnecessary costs and unnecessary risk with no reduction of mercury emissions from the kilns being monitored.

EPA appears to be concerned that the metals feedrate limits and the method of feedrate limit control under the BIF regulation is inadequate to control mercury emissions. This is understandable, but a misleading and an unfair assumption, given that the industry had not been required by BIF to limit mercury emissions to this level. Consequently, there would be no data indicating that such a method of control would be effective. The EPA is aware, however, that 57% of the cement kilns are currently meeting this emissions limit without continuous emissions monitoring and without making any real attempt at controlling mercury input (FR173 94, middle column) to levels below those required by BIF for health and safety reasons. Therefore, GCI would assert that EPA's requirement that cement kilns burning hazardous waste install mercury CEM monitors when it is known that many facilities would meet the standard regardless can be viewed as unwarranted. Such a view is unjustified and, if pursued, places the employees at these facilities at greater risk than they currently experience.

In addition, based on currently available test data, <u>none</u> of the mercury CEMs meet EPA's performance specification. In a paper presented at the annual meeting of the Air and Waste Management Association (A&WMA), June 1996, entitled "Performance Tasks of Mercury continuous Emissions Monitor at the U.S. EPA Incineration Research Facility" none of the three CEMS tested achieved the performance specification requirements. To quote the paper:

> *"The test results discussed above show that the measured results (editor: relative accuracy) of the mercury CEMs tested were often quite large. In fact, even the R,A 's for the best performing CEM based on a qualitative comparisons of CEM reading to RM (editor: reference method 29) measurements were no better than 60 to 90 percent. By comparison, EPA performance specification (PSS) for combustion gas CEMS, O_2 for example, are generally in the range of 20 percent RA. <u>This raises questions concerning whether mercury CEMS, even after further development can potentially meet at a 20 percent RA PS</u>."* Emphasis added.

Indeed, it is not just a matter of "raises questions" it is the matter of installing an obviously questionable monitoring device that will be used to determine compliance to a mercury emission standard. Given EPA's behavior under the current administration, it takes little imagination to envision fines and shutdowns of facilities based on an inappropriately applied technology.

Bear in mind that these performance tests were conducted on the emissions from a "pilot scale rotary kiln incinerator system." The feed material was an "attapulgate clay" to which was being spiked with 14 trace metals and three organic compounds. The metals were spiked onto the clay feed and into the burner flame, presumably at some uniform input rate. The kiln system and emissions control subsystems were presumably operated within optimum parameters. Consequently, the demonstration of such poor performances by the CEMs versus the reference method does not bode well for the ability of the CEM's to perform adequately in a "real" environment. Particularly when it is remembered that monitoring alone does not control emission and inaccurate monitoring does <u>nothing</u> to assist the facility in making decisions that <u>would</u> control emissions, quite the contrary. Bad data leads to bad decision making. Add to this the negative impact on human health and the environment due to the installation of the mercury CEM and its operation and it is obvious that this provision of the proposed HWC regulation would have an overall negative impact on mercury emissions.

CEMS.037(144)(a) VI. CEMS A. <u>Mercury CEMS should be optional (not required) since the Agency has not shown that they are reliable.</u> EPA has not shown that Hg CEMS are reliable or necessarily better than other methods of compliance demonstration. Hg CEMS should be a compliance option, just like it is for other metals.

CEMS.037(144)(b) In fact, EPA has just begun limited demonstration tests for Hg CEMS.

CEMS.037(144)(c) To remove the Hg CEMS requirement, §63.1210(k)(1) should be deleted.

CEM2.039(147)(a) III. COMMENTS ON QA/QC PERFORMANCE SPECIFICATIONS A.<u>Mercury CEM</u> EPA blurs the distinction between monitoring a pollutant and controlling a pollutant. Continuous emissions monitor systems (CEMS) do not control the pollutant emissions. Indeed, monitoring in some form and frequency is the first step to controlling emissions, but monitoring alone does not affect emissions. Continuous oversight is not needed or justified where experience under BIF indicates metals emissions are well controlled.

Unlike monitoring for total hydrocarbons and carbon monoxide, mercury is neither created nor destroyed during combustion. Hence, the use of a mercury CEM on a combustion device that does not control mercury emissions serves no purpose. If a particular kiln meets mercury emissions standard and is able, through existing controls to maintain this condition, then a mercury CEM is not necessary, is arbitrary, capricious, and exceeds the Agency's statutory authority.

Continental's position is well documented. In February, 1996, Continental conducted the first phase of its Trial Burn test. Part of this testing included metal emissions determination. Using Method 29, while operating at maximum BIF operating conditions, Continental demonstrated mercury emission rates of 5.99 μg/dscm, 12.6 μg/dscm and 13.7 μg/dscm (corrected to 7% O_2)for each of the three runs. Clearly, these emission rates are well below the proposed standard of 50 μg/dscm. In addition to these documented emission values, Continental also conducted a process sample analysis which documents a maximum mercury input rate of 0. 16 grams per minute which, even assuming <u>no</u> retention of mercury within the system, calculates to an emission rate of 45 μg/dscm, also below the proposed standard. Clearly, based on this worst case operating test, Continental already complies with the proposed standard. Furthermore, Continental has demonstrated that we possess and routinely use data from the analytical analysis of the kiln feed components (raw feed, coal, and hazardous waste ftiels) to limit the input of mercury (and all of the other BIF metals) such that emissions do not exceed the health-based criteria specified by the BIF regulations. Specifically, Continental has made the following demonstration:

1. Mercury emissions at Continental are well below the proposed standard.

2. Mercury input to the kiln system during this same test was insufficient to cause the kiln exhaust to exceed the proposed standard, even with no mercury retention.

3. Continental has demonstrated the ability to analyze and control the input of mercury (and all other BIF metals) without the use of CEMS.

Continental, therefore, fails to understand the need to install and maintain a mercury CEM at enormous expense, not only in terms of dollars but in terms of increased risks to human health and environment.

Indeed the proposed regulation allows a facility to control mercury emissions via feed rate limits alone and without the requirements to install a mercury CEMs. § 63.1210(a)(3). Unfortunately, this waiver does not allow for the system removal efficiency (SRE) that the individual kiln system achieves for mercury. EPA should provide an option to allow a facility to calculate mercury emission rates and use SRE controls to meet the mercury emission limits. EPA must also adjust the waiver requirements to allow for differences in analytical detection limits for the various kiln feeds so that a source can demonstrate that the mercury input would not exceed the allowable emission rate. Without providing this flexibility, the requirements would virtually preclude a cement kiln from utilizing a mercury CEM waiver. The net effect is that EPA forces the installation of a mercury CEM with all the attendant risks to human health and the environment noted below and without achieving a reduction in mercury emissions or other environmental benefits.

CEM2.039(147)(c) EPA appears to be concerned that the metals feedrate limits and the method of feedrate limit control under the BIF regulation is inadequate to control mercury emissions. This is understandable, but a misleading and an unfair assumption. There is no data indicating that such a method of control would be effective. Accordingly, the requirement is arbitrary and capricious. EPA is aware, however, that 57% of the cement kilns are currently meeting the proposed emission limit without continuous emissions monitoring and without a need to make significant modifications to control mercury input (FRI7394). As EPA is also aware, these levels are below those required by BIF for protection of human health and the environment; therefore, EPA's proposal is wholly unjustified and unwarranted. Such a view, if pursued, places the employees at these facilities at greater risk than they currently experience.

We point out again that, based on currently available test data, none of the available mercury CEMs meet EPA's performance specification. In a paper presented at the annual meeting of the Air and Waste Management Association (A&WMA), June 1996, entitled "Performance Tasks of Mercury continuous Emissions Monitor at the U.S. EPA Incineration Research Facility," none of the three CEMS tested achieved the performance specification requirements:

> *The test results discussed above show that the measured RAs (editor: relative accuracy) of the mercury CEMs tested were often quite large. In fact, even the RA's for the best performing CEM, based on a qualitative comparisons of CEM reading to RM (editor: reference method 29) measurements were no better than 60 to 90 percent. By comparison, EPA performance specification (PSS) for combustion gas CEMS, O_2 for example, are generally in the range of 20 percent RA. <u>This raises questions concerning whether mercury CEMS, even after further development can potentially meet at a 20 percent RA PS</u>.* (Emphasis added)

Indeed, it is not just a matter of raising questions, it is a matter of installing an obviously questionable monitoring device to determine compliance with a mercury emission standard that can be met and verified by simpler means. It takes little imagination to envision the enforcement actions and fines based on an inappropriate technology.

Bear in mind that these performance tests were conducted on emissions from a "pilot scale rotary kiln incinerator system." The feed material was an "attapulgate clay" spiked with 14 trace metals and three organic compounds. The metals were spiked onto the clay feed and into the burner flame, presumably at some uniform rate. The kiln system and emissions control subsystems were presumably operated within optimum parameters. Consequently, the demonstration of such poor performances by the CEMs compared to the reference method does not bode well for the ability of the CEMs to perform adequately in a "real" environment. More poignantly, inaccurate monitoring does <u>nothing</u>, to assist the facility in making decisions that <u>would</u> control emissions. Consequently, in light of the negative impacts on human health and the environment associated with installation and operation of Hg CEMS, and it is obvious that EPA failed to consider all relevant facts and to acknowledge the serious limitations in the technical data.

CEM2.041(153)(a) IV. MERCURY EMISSIONS A. Continuous Emission Monitoring System (CEMS) (61 Fed. Reg. at 17,427-17248) CWM advocates the thorough testing, installation and use of a reliable and accurate Hg CEM as outlined in the Agency's proposal. Through the utilization of CEMS, a direct assurance of compliance with an emission standard can be demonstrated, avoiding the establishment and imposition of arbitrary operating parameters which can, in many instances, conflict with other operational conditions to cause unsteady-state operations with no guarantee of emission standard compliance. Additionally, CWM strongly believes that where CEMs are mandated or optionally used, there should be no front-end operational constraints, such as feed rates or extraneous APC monitoring/control parameters, due to their redundant and arbitrary nature.

CEM2.041(153)(c) CWM's major concern in using newly developed instrumentation is the reliability issue. Due to the considerable expense to purchase, install, calibrate and maintain a CEM, spare units are not usually purchased. If an instrument is not reliable, which is probable since the instruments have not been proven to meet Performance Specification 12, the performance specification requirements state that the instrument must be shutdown, which would lead to unnecessary and unacceptable incinerator down times. As a result, CWM is urging the Agency to make the use of a Hg CEMs optional.

CEM2.043(163) MERCURY CONTINUOUS EMISSION MONITOR Medusa-Crescent believes that the requirement of Mercury CEM which has not been proven effective on cement kilns is unduly burdensome and unnecessary and should be removed. Four different test data for which have been filed with the EPA indicate that complying to the proposed stringent mercury emission standard under the proposed rule is not a problem even during COC testing when the systems are stressed. The feed rate of mercury is continuously monitored as a part of the BIF regulation requirements and should be sufficient to demonstrate compliance to the mercury standard. Studies have indicated that most of the mercury feed to cement kilns is from naturally occurring raw materials and coal rather than hazardous waste. This requirement should not be a part of a rule that regulates hazardous waste combustion. Medusa-Crescent also believes that cement kilns should not be required to install mercury CEMs when EPA is not requiring installation of mercury CEMs on much larger mercury emitters, such as, the power plants.

CEM2.048(180) Mercury CEMs are not proven and not needed for HWIs.

CEM2.052(187) 2. Mercury The requirement of a Hg CEMS is premature. Until it has been demonstrated in the field that a reliable and cost-effective Hg CEMS is commercially available, this requirement should be deferred, and reconsidered in a supplemental proposal.

CEM2.053(191) 81. Page 319 The requirement for mercury CEMS is unacceptable. Simply because a CEM is in development does not mean that it will become a usable item. The Agency just started a demonstration program to determine if CEMS can comply with the mercury and PM standards proposed in this rule. Without a database on the results of this study legitimate comments cannot be offered. However, just the complexity of wet chemistry followed by an elemental mercury analyzer assures massive O&M problems.

Since the Agency has targeted mercury as a major concern there should be no waver of monitoring for small sites.

The Agency intends to require CEMS for mercury, but has not even answered basic questions such as how to correlate total mercury emissions to an elemental mercury CEM. This information must be developed before requiring facilities to spend large amounts of money on equipment.

CEM2.058(212B) E.Mercury i. High statistical uncertainty of metal emissions results derive from an inadequate database unsuitable for regulatory interpretation. Two reference method samples were collected for comparison with CEMS EER reports that the average CEMS response was 1.25 times the average of these reference points and this result "is in agreement within the statistical uncertainty of the data, which is large since only two measurements were obtained." The resulting 2.5% error confidence interval of 427% suggests that statistical comparison to limited data is not a technically defensible exercise. Considering EPA's proposed requirement for a total, and not elemental mercury CEMS, performance data of acceptable quality should be gathered.

ii. The mercury CEMS sub-isokinetic sampling will overestimate emissions when carbon injection is implemented or the ESP operates at lower temperatures.

The CEMS collection rate at 12% of isokinetic will incur an large oversampling error, as proposed in the report, because particulate matter can be a significant source of mercury emissions. Particulate scavenging of mercury was demonstrated by EER's testing of carbon injection effectiveness. Additionally, mercury concentrations in CKD, higher than EER's ESP 4th-stage activated carbon concentrations, were measured during Radian's April testing at Lafarge when ESP inlet temperatures below 400°F were demonstrated. EER's measure of the potential sub-isokinetic bias did not consider lower ESP inlet temperatures than those demonstrated during their limited number of reference method test runs.

iii. Mercury CEMS results are susceptible to bias from the poorly sampled slipstream and leakage in the IWS unit.

The Verewa mercury CEMS sampled downstream of the IWS. As mentioned above, a non-representative slipstream and significant ambient air leaks in the IWS compromised the accuracy of all slipstream sampling results. As a point sample collected non-isokinetically, the CEMS data is particularly susceptible to compromise without adequate stratification data.

CS3A-005 (5) The Dow Chemical Company (Dow) supports EPA's desire to promote the development of new technologies. We appreciate this opportunity to comment on EPA's progress so far. Three copies of these comments are enclosed. The demonstration project of continuous Particulate and Mercury emissions monitors is a good start in the evaluation of these technologies. However, Dow believes that a full meaningful comprehensive study will take several years to complete. As will be commented on later, it is felt that the current studies are much too narrow and are not representative to the majority of operating conditions on hazardous waste combustors. Dow has worked closely with the Coalition for Responsible Waste Incineration (CRWI), helping to draft its comments on this NODA. We fully agree with all of the comments submitted by CRWI and incorporate CRWI's comments by reference into these Dow comments. Dow comments separately to emphasize the following matters. In reviewing the reports published by EPA in the Notice of Availability (NODA) on March 21, 1997, Dow has focused o n the "Status No IV- Particulate Matter CEMS Demonstration." The work performed under EPA's direction is an essential part of making continuous emissions monitors for particulate matter available to industry. Only with independent review and unbiased study can an operator be assured that these systems will eventually perform to EPA's standards. These comments do not address the mercury continuous emissions monitoring systems (CEMS) studies, because the EPA has admitted that the technologies employed in their study did not work well enough to be used as a compliance tool. More work an d additional commenting clearly are needed before mercury CEMS are required The demonstration project conducted at the DuPont facility is an excellent step towards instituting these CEMS on a broader basis. However, the initial data has many errors, questionable QA/QC procedures, and was not performed on a stack gas that is representative of the majority of hazardous waste combustors. This demonstration falls short of proving these systems are ready for commercial installation.

CS3A-009 (4). As for the mercury test, there is little doubt that EPA cannot support finalizing a rulemaking requiring mercury CEMS. While EPA is not including information from the demonstration test in the NODA, the information collected thus far shows that none of the mercury monitors used in the demonstration test met EPA's pre-established criteria. Beyond that, none of the monitors were even designed to meet EPA's criteria. Thus, it is clear that the mandatory use of mercury CEMS monitoring cannot be technically supported at this time.

CS6A-003 (4). 9. Kodak supports EPA's proposal to make Hg, Cl and Multi-metals CEMS optional, but not required. The demonstration data indicates these units are not reliable or accurate enough for use in most applications. Allowing their optional use will encourage future development and use.

CS6A-011 (4). CKRC supports the Agency’s decision not to require the use of Hg-CEMS on cement kilns (62 FR 67789). EPA does mention that facilities should have the option of “using Hg-CEMS if desired as long as the permitting agency approves on a site-specific basis the Hg CEM, and its site-specific performance specifications.” (62 FR 67789). The suggested option is similar to the concept of equivalency demonstrations as envisioned by CKRC (CKRC’s August 19, 1996, p. 395). CKRC is supportive of EPA’s concept to allow facilities the option of a site-specific equivalency determination to use Hg-CEMS (or other optional CEMS).

CS6A-025 (4). The ETC supports EPA’s decision not to require use of Hg CEMS, based on the problems encountered in the demonstration testing. Unless a CEM device can be demonstrated to meet certain minimum performance criteria with regard to accuracy and precision, its use should not be required as a compliance tool. The testing program for Hg CEMS revealed substantial problems, and EPA has not sufficiently demonstrated the viability of Hg CEMS as a compliance tool at all hazardous waste combustors. We further agree with the agency’s conclusion that facilities should have the choice of using Hg CEMS if desired or basing compliance on operating parameters as discussed in the proposed MACT rule.

CS6A-026 (4). In the NODA, EPA acknowledges that to require CEMS for compliance it must determine that the CEMS are commercially available and have been demonstrated to meet certain performance specifications. The Agency found certain aspects of the testing program revealed substantial problems regarding the measurement of the Hg CEMS accuracy and precision. As a result, the Agency concluded it had not sufficiently demonstrated the viability of Hg CEMS as a compliance tool and should not require their use (62 FR 67789). Ash Grove supports EPA’s decision not to require Hg CEMS on cement kilns.

CS6A-029 (4). EPA has declined to require Hg CEMS because it has determined that they are not commercially available. This determination remains unconvincing, given that Hg CEMS are actually in use in Germany. Even if Hg CEMS are unavailable, however, EPA should commit to test them regularly (at least annually). EPA must also include a provision in this HMC rule that sources will be required to install and use Hg CEMS as soon as EPA determines that they are commercially available. Otherwise, EPA will only be able to require the used of Hg CEMS by a rule revision, which would cause unnecessary delays in the deployment of these important monitoring systems. To the extent that EPA has determined not to require any other CEMS because it believes that they are not commercially available, EPA must also test these CEMS at least annually and include a provision in the HWC rule requiring their use as soon as they become commercially available. EPA has failed to require Hydrogen Fluoride CEMS without explanation.

CS6A-030 (4). II. The Hg CEMS Demonstration Tests In describing aspects of the Hg CEMS demonstration testing that revealed substantial problems with CEMS accuracy and precision, EPA found it difficult to dynamically spike known amounts of mercury (in the elemental and ionic form) and obtain manual method and Hg CEMS measurements that agree at the test source (62 FR 67789, col. 3).

The statement may indicate a fundamental research concern of demonstrating mercury removal in combustion systems. What degree of confidence exists in the scientific community that the reported trial burn results that appeared in the Combustion Emissions Technical Resource Document (CETRED) are a valid baseline? The reported mercury results indicate a broad range of results indicating that precision, accuracy and repeatability may not be met when attempting to quantify mercury emissions. Compliance with any mercury standard is dependent on a more thorough understanding of mercury behavior. The Department agrees with EPA s belief that the viability of Hg CEMS has not been demonstrated and suggests that continued work with mercury and attempting to complete material balances is probably required.

RCSP-143 (5).

Parameter	BIF Requirement	HWC Requirement
Mercury	No CEM Required.	1. Install and check out. 2. Conduct Calibration Error Test (CE) 3 levels, deviates <15% of reference. 3. Conduct Interference Response Test, deviate < 10% of limit, includes Response Time Test. 4. Conduct 7 day CD/ZD Test, <10%/<15% of limit. 5. Conduct Instrument.Multi-Metal Method Correlation Test. Minimum of 3 tests. 6. Calculate relative accuracy values, deviate <20%/<10% as applicable.

1.0 Mercury CEM

There should be a distinction made here between the monitoring of a pollutant and the control of a pollutant. Continuous emissions monitor systems (CEMS) do not control the emissions of a pollutant. Indeed, monitoring in some form and frequency is the first step to controlling emissions, but monitoring alone does not affect emissions. Continuous emissions monitoring does not contribute to emissions control, but serves only as a "policing" function; continuous oversight where no oversight is needed or justified. On the other hand, controlling emissions does not require CEMS. The BIF regulation has done very well in controlling metals emissions without the use of CEMS.

Unlike the monitoring of total hydrocarbons and carbon monoxide emissions, which EPA has linked to the proper operation of a combustion device, (although here again the EPA knows that the THC and CO in cement kiln stack emissions have little or nothing to do with illustrating the combustion conditions in the combustion zone, FR17397) mercury is neither created nor destroyed during combustion. Hence, the use of a mercury CEM on a combustion device that makes no attempt nor has a need to control mercury emissions serves no purpose but that of omnipresent oversight. To put it another way, if a particular kiln currently does not have mercury emissions that exceed the proposed standard and is able, through currently applied technology, to demonstrate that they have the ability to maintain this condition what justification can be offered to require a mercury CEM?

As an example, such a scenario can be demonstrated for Continental Cement Company. In February, 1996, Continental conducted the first phase of their Trial burn test. (GCI managed this test.) Part of this testing included metal emissions determination. Using Method 29, while operating at maximum BIF operating conditions, Continental demonstrated mercury emission rates of 5.99 µg/dscm, 12.6 µg/dscm and 13.7 µg/dscm (corrected to 7%02) for each of the three runs. Clearly, these emission rates are well below the proposed standard of 50 µg/dscm. In addition to these documented emission values, Continental also conducted a process sample analysis which documents a maximum mercury input rate of 0. 16 grams per minute which, if there were no retention of mercury within the system, would calculate to an emission rate of 45 µg/dscm, also below the proposed standard. Clearly, based on this test conducted at worst operating conditions, Continental does not have a mercury emission "problem." Furthermore, Continental has demonstrated that they possess and routinely use data from the analytical an analysis of the kiln feed components (raw feed, coal, and hazardous waste fuels) to limit the input of mercury, and all of the other metals regulated under the BIF regulation, to preclude emitting these metals at rates in excess of the health-based criteria specified by the BIF regulation. Continental has made the following demonstration:

1) Mercury emissions at Continental are well below the proposed standard.

2) Mercury input to the kiln system during this same test was insufficient to cause the kiln exhaust to exceed the proposed standard.

3) Continental has demonstrated the ability to analyze and control the input of mercury (and all other BIF metals).

We fail to understand the purported need to install and maintain at enormous expense, not only in terms of dollars but in terms of potential increased risk to the human health and environment, a mercury CEM.

Indeed, the proposed regulation allows a facility to control mercury emissions via feed rate limits alone and without the requirements to install a mercury CEM's, 63.12 1 0(a)(3). However, this waiver does not allow for the system removal efficiency (SRE) that the individual kiln system achieves for mercury. The facility should be allowed to apply such a SRE when calculating a mercury emission rate from one. Additionally the lower analytical detection limit for the various kiln feeds may not be sufficiently low to demonstrate that the mercury input would not exceed the allowable emission rate as required by the waiver. Taken together, these requirements virtually preclude a cement kiln from utilizing the waiver from the installation of a mercury CEM. The net effect is the forced installation of a mercury CEM with all the attendant risks to human health and the environment as noted above, with no possible reduction in mercury emissions.

RSCP-144 (1)(b) 2.0 Mercury Monitor There are some differences in the technologies used by various vendors. Currently, the available data does not indicate that any of the vendors have a monitor that meets the performance specification. It is estimated that the cost to install a monitor that has proven reliable in service in Europe would be around $113,000. This includes shipping and customs fees, installation and training of facility technicians.

As with the particulate monitor, the electronic data from this instrument will need to go to a data manager for rolling average computation and a comparison to operating limits values. If the current data manager operated by the facility is unable to handle these tasks, an estimated $10,000 would probably be needed for the computer hardware and software to perform this task. These cost estimates do not include enclosures or services (such as electrical or air conditioning, etc.)

RSCP-144 (4) We believe that feed sampling and continuous sampling devices should be options for Hg compliance as discussed in comments VI.C. and V.A.

<u>Comment Summary for Issue 1</u>

Though there was some dissenting opinion, commenters believe Hg CEMS are not commercially available or otherwise not adequately demonstrated (inaccurate, not durable, etc.) to require them at HWC sources, especially sources with low Hg emissions. Other specific concerns include:

- EPA proposed requiring a mercury monitor made by a company known as Verewa;
- EPA should not require a CEMS only manufactured by a foreign (non-US) source;
- There is only one manufacturer of Hg CEMS;
- EPA should require only equipment that is commonly available;
- Operating parameter limits are more likely to ensure that facilities do not the Hg (assumed by context) standard;
- EPA lacks the technical or legal basis to require Hg CEMS;
- Facilities should have the option of using either Hg CEMS or feedstream/operating parameter limits;
- There are six Hg CEMS manufacturers, but 2 are prototypes or still under development;

- Six users of Hg CEMS did not offer negative comments on their use;
- Hg CEMS generate waste product;
- Hg CEMS are costly;
- The Hg limit is excessively stringent, so Hg CEMS are redundant;
- Hg CEMS do not control Hg, but only serve as a “policing” function, so they are not justified;
- Manufacturing, transporting, installing, and maintaining Hg CEMS have a negative impact of human health;
- EPA just began testing Hg CEMS;
- Hg CEMS would lead to more facility downtime;
- Sub-isokinetic sampling used by Hg CEMS will lead to an overstatement of emissions when carbon injection is used at lower temperatures; and
- The Verewa mercury CEMS sampled downstream of the IWS. As mentioned above, a non-representative slipstream and significant ambient air leaks in the IWS compromised the accuracy of all slipstream sampling results. As a point sample collected non-isokinetically, the CEMS data is particularly susceptible to compromise without adequate stratification data.

Response to Issue 1

EPA conducted an extensive demonstration of Hg CEMS at a cement kiln. See Chapter 12 of the Technical Support Document Volume IV for more information on this demonstration test. EPA concluded that we could not adequately demonstrate the viability of Hg CEMS at a site which is worst case for performance of the Hg CEMS. Therefore, EPA will not require Hg CEMS in the final rule.

EPA does believe Hg CEMS will work at sources which are not so severe relative to the Hg CEMS performance, though. We also believe further development of Hg CEMS over time will enhance their performance, and the willingness of facilities to install CEMS whenever they become commercially viable. Therefore, we are leaving the door open for facilities to use Hg CEMS for compliance with the Hg standards contained in today’s final rule if they choose to use them.

EPA did not propose that sources install equipment made by one manufacturer.

EPA does not agree that the source of a monitor (foreign or US manufactured) should have any bearing on whether the device should be required in rulemaking.

EPA tested three Hg CEMS at its demonstration test and one commenter mentioned as many as six

Hg CEMS manufacturers. Therefore, we do not agree that only one Hg CEMS manufacturer exists.

EPA agrees that it should require equipment only if it is commonly available, but EPA disagrees that the commenter's assertion that Hg CEMS are not commonly available. It would be more accurate for the commenter to say that Hg CEMS are not commonly in use. EPA does not agree that it should only require devices that are in use. If this were the case, industry could dictate what devices to use simply be not using it. EPA believes a more accurate way to determine whether to use a monitoring technique is through the monitoring hierarchy discussed in section 1 issue 5 of this volume, and the "Monitoring Hierarchy" part of Volume II of the Response to Comments Document.

EPA agrees that at the worst case source (for Hg CEMS performance) it tested, operating and feedstream limits would better ensure compliance than Hg CEMS.

EPA believes it has the legal basis to require CEMS, but Hg CEMS were shown to not be technically feasible at a source which is worst case for performance of the monitors.

EPA notes commenter's belief that six CEMS exist and that two of the CEMS were prototypes.

EPA also notes that six users of Hg CEMS had no negative comments.

EPA agrees that Hg CEMS are costly. This was factored into the decision not to require them.

EPA does not understand the commenter's assertion that a stringent standard causes a CEMS to be redundant.

EPA agrees that Hg CEMS are not a control device, but disagrees that using Hg CEMS are not justified because they serve a "policing" function. We believe the giving facilities the ability to know what their Hg emissions are at all times will lead to an overall reduction in Hg emissions since they will have better data to know under what circumstances to curtail Hg feed or impose better controls.

EPA does not agree that the acts of manufacturing, transporting, installing, and maintaining CEMS will have a negative impact on human health.

EPA notes the commenter's concern that the Hg CEMS Demonstration test program began about the time the proposed rule was published. The two notices of data availability (published on March 21 and December 30, 1997) on this subject to ensure sufficient comment on the proposed Hg CEMS requirement.

EPA agrees with the commenter that Hg CEMS might lead to more facility downtime, especially if the Hg CEMS has low data availability and there is no option for allowing a facility to continue operation when the Hg CEMS is not operating. See section 1 issue 3 of this volume of the Response to Comments Document for more information on data availability and CEMS downtimes.

EPA has no data on from which to derive a response to the last two summarized comments dealing with Sub-isokinetic sampling or how the Verewa monitor reacts downstream of an IWS.

2. Testing Required for Hg CEMS Poses a Health Risk

Comment

CEM1.045(143) These individuals will be exposed to added health risk primarily due to potential exposure to gases or solutions used in equipment testing and calibration.

RCSP-143 (3) Part of the daily audit required for any monitoring system includes a zero and span calibration. To accomplish this for the mercury monitor requires that a gas or solution containing mercury be injected into the analyzer. Decidedly this is a small amount of material, the technician who executes this procedure however is in intimate contact with this equipment and is potentially exposed on a routine basis. There are certainly precautions that can be taken to mitigate this potential exposure but this activity should be included in any risk assessment of increased monitoring. The HWC regulation has added a number of such calibration audits. Daily calibration audits for the multi-metals CEM. Quarterly absolute calibration and interference response tests for the mercury analyzer. Daily calibration drift and quarterly absolute calibration audits and interference. response tests for the hydrogen chloride and chlorine analyzers. EPA's concern for the "potentially dangerous" metals spiking apparently does not extend to CEMS which operation requires this level of daily, quarterly and annual calibration testing using the same toxic materials. Under BIF the potential exposure occurred over a very limited period once every three years (interim status) or five to ten years (permit status) versus daily. Under BIF this potential exposure was limited to a much smaller group of people with considerable elapsed time between episodes. Now, however, under the proposed HWC rules the potential exposure could easily become chronic low level exposure to a much larger group of people.

Summary

See brief comment.

Response

EPA believes the mercury samples handled by test personnel can be used in a safe manner.

3. Hg CEMS Testing (General)

Comment

CEM2.034(143)

Parameter	**BIF Requirement**	**HWC Requirement**

Mercury	No CEM Required.	1. Install and check out. 2. Conduct Calibration Error Test (CE) 3 levels, deviates <15% of reference. 3. Conduct Interference Response Test, deviate < 10% of limit, includes Response Time Test. 4. Conduct 7 day CD/ZD Test, <10%/<15% of limit. 5. Conduct Instrument. Multi-Metal Method Correlation Test. Minimum of 3 tests. 6. Calculate relative accuracy values, deviate <20%/<10% as applicable.

CEM2.039(147)(b) As we have alluded to above, requiring mercury CEMS results in substantial negative environmental and human health impacts would be substantial. The manufacturing, transportation, installation and maintenance of these devices have real impacts on the environment and human health. For example, the performance specification (PS12), as proposed, requires that a gas containing mercury be injected into the analyzer each day and each quarter. EPA's requirement that Continental install, operate, and maintain a mercury CEM as detailed in the performance specification will increase the mercury emissions from the facility, while at the same time increasing costs and risks with no reduction in mercury emissions from the kiln.

CEM2.056(208) 3. Performance Specification 12, Section 7 (p.17508): No mention is made of dealing with normal emissions that are below the normal CEM detection limit.

In the preamble, EPA suggests that it will require CEMS for mercury in the promulgation of the final MACT Rule. However, EPA does not propose any method of performing the necessary calibration of such an instrument in the proposed rule in the event that normal emissions are below the instrument detection limit. Whereas EPA recommends spiking with metals for the calibration of multiple metals CEMS (discussed above), EPA ignores the realistic situation of non-detectable emission levels of mercury. Medusa-Citadel, Inc. believes that EPA must realistically address the requirements of CEMS calibration prior to requiring the installation and use of these instruments.

Comment Summary

Commenters address three issues:

- A summary of the Hg CEMS test requirement, compared to those under the BIF rule;
- The injection of known concentrations of Hg poses an increase in Hg emissions; and
- The proposed Performance Specification (PS) 12 (for Hg CEMS) does not address how to calibrated the Hg CEMS under circumstances where normal emissions are less than the detection limit of the CEMS.

Response

EPA concurs with the summary of test requirements.

EPA does not agree with an increase in Hg emissions will result. Calibrating Hg CEMS will cause very small quantities of Hg to be emitted to the environment, but this small increase would be offset by better control of Hg emissions when the facility's Hg emissions approach the standard and the elimination of Hg performance testing, whereby far more Hg would be emitted in the stack gas.

EPA does not understand what bearing a facilities normal Hg emissions has on the calibration procedure. We believe PS12 adequately covered the circumstance described by the commenter.

4. March 1997 NODA Hg Report Comments.

Comments

CS3A-010 (10). C. Site-Specific Quality Assurance Test Plan Method 301 Validation of A Proposed Method 101B for Mercury Speciation CKRC is unable to provide meaningful comment on this document. Even though the scheduled dates for a speciated mercury method test and mercury CEMS are past, the test results are not provided. We request that both the speciation method validation test results and the simultaneous manual method and -Mercury CEMS data be released for review prior to the Agency taking any final action on Mercury CEMS. Regarding the test protocol, it appears that it generally follows the guidance provided in Method 301. We bring to EPA's attention that the practical quantitation limit [PQL] should be determined for the method.

CS3A-010 (10). Section 1.3, Item 1, page 6 of 12, first bullet. EER states that Commercial hazardous waste incinerators typically have very low mercury emissions (because they avoid mercury in the feed). This is an incorrect statement for a number of reasons. There is little difference in mercury emission rates between incinerators and cement kilns. The emission rates for kilns based on 1992 COC tests ranged from 2.26E-05 to 2.26E-01 grams per second. For incinerators that conducted trial burn tests (prior to April of 1993) and reported metal emission rates, mercury emissions ranged from 2.72E-06 to 2.41E-01 grams per second. Considering that incinerators generally have much lower stack gas volume emission rates then cement kilns, the concentration of mercury in the cement kiln flue gas will be lower than that of incinerators. Interestingly EER's statement that, Cement kilns have much higher emissions because a significant portion of the input mercury may be derived from the raw meal., while true, is, however, at odds with the proposed HWC regulation. The EPA has stated in the proposed regulation that, raw materials and fossil fuels also contribute to cement kiln mercury feed rates and emissions, emphasis added, (FR17393). The EPA Intends that cement kilns meet the MACT floor level by controlling mercury feedrate input in the hazardous waste feed to the kiln. Since the operation of the kiln will include periods of time when hazardous waste fuel is not used it would be interesting to make a comparison of the mercury emission rates during the periods and during periods when hazardous waste fuel is being utilized. Such a comparison should be added to the test plan.

CS3A-010 (10). Section 5.3, page 15 of 24, Process Sampling. This plan calls for SK to sample the kiln feed materials, coal and hazardous waste daily and analyze these samples for mercury content. It is not specified here if this may be the routine analysis conducted daily, or if this is to be a separate analysis, or if there is to be a specific method utilized for this analysis, etc. Section 6.2, page 4 of 8, calls for these samples to be analyzed in the same manner as the flue gas samples. This is not the manner in which these samples are routinely analyzed. The sampling and analysis of the process feeds should be clarified.

Comment Summary

Commenters made several observations relative to Hg CEMS report found in the March 1997 NODA. These include:

- The inability to comment on method 101b due to a lack of details;

- That statements made relative to incinerator and cement kiln emissions mercury emission are inaccurate; and

- The sampling and analysis if feeds needs to be clarified.

Response

EPA will take these comments into account if it reproposes an Hg CEMS or Method 101B requirement in the near future.

Multi-metal CEMS

1. MM CEMS Use (General)

Comment

CEM3.002(101)(d) 4. Semivolatile Metals (SVM) and Low Volatile Metals (LVM) R-P's main concern is the lack of availability of MM CEMS. We support the option to use either CEMs or feed stream monitoring to document compliance with metals emission limits. With regard to limitations on operating parameters to document compliance with metals emission limits, our main concerns are with the application of lower particulate matter (PM) limits and feed stream testing, as discussed below.

Option 1: Use of a Multi-metal CEMs to Document Compliance EPA requests comment on how to address CEMS that are not capable of detecting all of the metals (17429/2). R-P supports the option of using a CEM if at least half of the metals are measurable.

CEM3.006(106)(a) MM CEMs EPA requests comment on how to address CEMS that are not capable of detecting all of the metals (17429/2). ENSCO supports the option of using the CEM if at least half of the metals are measurable. In this case, the metals that cannot be detected by the CEM would be controlled by doing feed stream analysis.

CEM3.007(111) In an effort to monitor development of Multimetal CEMS, the CEM subcommittee of the American Society of Mechanical Engineers ("ASME")Research Committee on Industrial and Municipal Waste has been conducting periodic meetings of CEM developers and interested technical people. So far, research indicates several devices have shown promising results. If future development of these devices is satisfactory, it is possible that Multimetal CEMs may be commercially available within 2-3 years. However, these devices are not available today.

The EPA is proposing incentives (removal of the requirement for feed metals analysis) to encourage development of the CEMS. However, even with these incentives Multimetal CEMs are probably years away from being commercially acceptable.

CEM3.013(129)(a) The need for real-time CEM for metals has not been proven.

CEM3.014(130)(a) The CEM subcommittee of the American Society of Mechanical Engineers Research Committee on Industrial and Municipal Wastes has been conducting periodic meetings of CEM developers and interested technical people to monitor development of multi-metal CEMS. Several devices have shown promising results. The EPA is proposing incentives (removal of the requirement for feed metals analysis) to encourage development of the CEMS. However, multi-metal CEMs are probably years away from being commercially acceptable.

CEM3.020(153)(a) V. SEMI-VOLATILE METALS (SVM) and LOW VOLATILE METALS (LVM)

A. Continuous Emission Monitoring System (CEMS) (61 Fed. Reg. at 17,429)

CWM advocates the thorough testing, installation and use of a reliable and accurate SVM and LVM CEM as outlined in the agency's proposal. Through the utilization of CEMS, a direct assurance of compliance with an emission standard can be demonstrated, avoiding the establishment and imposition of arbitrary operating parameters which can, in many instances, conflict with other operational conditions to cause unsteady-state operations with no guarantee of emission standard compliance. Additionally, CWM strongly believes that where CEMs are mandated or optionally used, there should be no front-end operational constraints, such as feed rates or extraneous APC monitoring/control parameters, due to their redundant and arbitrary nature.

CEM3.NOD.001(147) We also note that multi-metals CEMS are as yet not commercially available. Cement kilns should not be subject to requirements for CEMS until viable alternatives can be evaluated. The CKRC approach should at most be available to cement kilns as an option to metals emissions compliance.

Comment Summary

Commenters suggest that:

- Facilities should be given only the option to use MM CEMS if half the metals are measurable by the CEMS;
- If at least half the metals are measurable by the CEMS, concentrations of metals not measured by the CEMS should be inferred through feedstream monitoring;
- Multi-metals CEMS are many years away from being accepted;
- The need for real-time MM CEMS is unproven;
- There should be no feedstream or APCD monitoring for metals if a MM CEMS is used.

Response

EPA promulgates the proposed option, which was supported by commenters, that facilities be required to monitor feedstream and other operating parameters to ensure compliance with the SVM and LVM standards, but that facilities should be given the option to use a MM CEMS if they choose. If a MM CEMS is used which measures all the SVM and LVM metals, no feedstream or operating parameter limits would be required for these metals while the MM CEMS is operational.

EPA does notbelieve that a CEMS that measures only half the metals that comprise the standard is an acceptable MM CEMS.

EPA agrees that monitoring is required for metals not measured by a MM CEMS. EPA believes feedstream monitoring, and possibly taking system removal efficiency into account is an acceptable way to do this. Again, this should be negotiated with the permitting authority.

EPA agrees that MM CEMS are many years away from being accepted, and that the need for real-time MM CEMS will be unproven until data concerning their cost, accuracy, and reliability is obtained.

2. Continuous Samplers Should be Allowed

Comment

CEM1.016(114)(f) Concern: The need for a real-time CEM for metals has not been proven. Short-term averaging times prevent the use of certain technology and increase (unnecessarily) the potential for permit exceedences.

Suggestion: Users support a continuous sampling technology with periodic analysis for metals. Averaging times should be based upon a process performance system performance specification approach for all monitored parameters. Emission averaging times for metals should be extended allowing longer sampling/analysis intervals.

CEM1.033(129)(b) Concern: The need for a real-time CEM for metals has not been proven. Short-term averaging times prevent the use of certain technology and increase (unnecessarily) the potential for permit exceedences.

Suggestion: Users support a continuous sampling technology with periodic analysis for metals. Averaging times should be based upon a process performance system performance specification approach for all monitored parameters. Emission averaging times for metals should be extended allowing longer sampling/analysis intervals.

CEM1.036 LIMITATIONS ON SEMI-CONTINUOUS SYSTEMS Problem The HWC MACT Rule seems to arbitrarily require, that CEMs used, have either 15 second minimum time for each individual reading (as specified in the BIF Rule) or for batch systems to evaluate continuous sampling measurements at least 3 times within the averaging time required for the specific pollutant measured. Although the agency recognizes the use of batch systems may be necessary concentration and measurement of some pollutants, the analytical cycle time required by the proposed rule does not allow use of the systems like the 3M semi-continuous metals and particulate sampling system which collects a sample over a 1-week time period for subsequent laboratory analysis. This system has been used by 3M for several years and is currently in use for compliance assurance for emission of RCRA metals under the facility's permit.

Solution Part Five, Section II. C in the Preamble of the MACT Rule: Compliance Monitoring Requirements of the Revised Standards for Hazardous Waste Combustors should also an option to use a combination of a reduced waste feed characterization based on process knowledge along with a semicontinuous emission monitoring (CSEM) for metals and particulate matter to control and demonstrate emissions of these compounds in place of either extensive waste feed analysis which is not feasible in many cases or the use of continuous emission monitors (CEMS) which are not yet available on a reliable commercial scale for these parameters.

CEM1.051(144)(a) We believe that feed sampling and continuous sampling devices should be options for Hg compliance as discussed in comments VI.C. and V.A.

CEM1.051(144)(b) C. The specifications for CEMS should be modified so that continuous samplers with later analysis can be used.

Continuous samplers give representative emissions determinations for metals, PM, and Hg. They appear to be feasible since 3M Corporation uses a continuous sampler in Minneapolis, MN. Continuous samplers are much more direct measurements of emissions than feed sampling, but feed sampling is the only other option offered by the Agency if real-time CEMS are not used. Therefore it would be in both the operator's and the Agency's interest to use continuous samplers instead of feed analysis.

The requirement to report CEMS analysis within one hour of sampling completion precludes the practical use of 3M style continuous samplers for metals, PM and Hg. A 12 hour averaging time requirement also make continuous samplers impractical. Continuous samplers are economical if monthly averaging times are used. There is no justification for requiring immediate analytical results or for requiring short averaging time for metals. Two papers are enclosed which show why monthly averaging times for metals will protect human health and are consistent with RCRA and the CAA requirements. These papers are also discussed in more detail in the data averaging time comment V.A.

Unique specifications for continuous samplers should be developed for Hg, SVMs, LVMs, and PM. The following change to the specifications for batch sampling CEMS is the key to allowing a continuous sampling method. This change should be made to 40 CFR Part 60 Appendix B sections 4.5.3 of Performance Specification 10 for multimetals, 4.5.2 of Performance Specification 11 for PM, and 4.6.3 of Performance Specification 12 for Hg.

Specification 10- 4.5.3 Response Time for Batch CEMS. The response time requirement of 4.5.1 and 4.5.2 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling period and reporting of the sample analysis shall be no greater than one week. Sampling is also required to be continuous except that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or one hour whichever is less.

Specification 11- 4.5.2 Response Time for Batch CEMS. The response time requirement of 4.5.1 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling period and reporting of the sample analysis shall be no greater than one week. Sampling is also required to be continuous except that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or one hour whichever is less.

Specification 12- 4.6.3 Response Time for Batch CEMS. The response time requirement of 4.5.1 do not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling period and reporting of the sample analysis shall be no greater than one week. Sampling is also required to be continuous except that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or one hour whichever is less.

CEM3.025(182) 5. EPA's CEM specifications need to be modified to allow use of semi-continuous monitors for metals

As in the previous comments, Dow supports and incorporates by reference, CRWI's comments on the use of semi-continuous metals monitors for a couple reasons. First, a viable multi-metals monitor is unlikely to be available when compliance with these rules will be needed. Therefore, since the 3M type system is available and validated, EPA should expand its specifications to allow its use if facilities choose to install it. Second, consistent with Dow's and CRWI's previous comment, less than one week averages are not needed to assure proper feed management to protect human health or the environment.

CEM3.026(183)(b) 2) The need for a real-time CEM for metals has not been proven. Short-term averaging times prevent the use of certain technology and increase (unnecessarily) the potential for permit exceedences.

3M support a continuous sampling technology with periodic analysis for metals. Averaging times should be based upon a process performance specification approach for all monitored parameters. Emission averaging times for metals should be extended allowing longer sampling/analysis intervals

CS3A-011 (5) AVERAGING TIMES, AND TIME FOR SAMPLE ANALYSIS, SHOULD BE LONG ENOUGH TO ENABLE USE OF CONTINUOUS SAMPLERS The specifications for CEMs should be modified so that continuous samplers with later analysis can be used in addition to the real time monitors tested. Continuous samplers give representative emissions determinations for PM and they appear to be feasible, since 3M Corporation uses a continuous sampler in Minneapolis, MN. Continuous samplers are direct measurements of PM emissions and give good long term average emissions levels. The proposed requirement to report CEMs analysis within one hour of sampling completion precludes the practical use of 3M-style continuous samplers. A 12 hour averaging time requirement also makes continuous samplers impractical. Continuous samplers are economical if weekly or monthly averaging times are used. PM from HWCs has not been associated with any acute health hazards, and there is no justification for requiring immediate analytical results or for requiring short averaging times. (These two points were discussed in detail in comments and papers submitted on the HWC proposed rule by CMA and Kodak on August 19,1996.) Additionally, the problems with the accuracy of the PM real-time CEMs (discussed in Comments 1 and 2) may necessitate relatively long averaging times to help smooth data scatter. Therefore, there is no value to requiring short reporting times for PM CEMS. CMA's HWC comments explain at length why longer averaging times should be established in the final rule. See Comments at 64-67. Another key to allowing a continuous sampling method is to change the specifications for batch sampling PM CEMs to allow time for sample analysis. The following change should be made to proposed section 4.5.2 of Performance Specification II for PM in 40 CFR Part 60 Appendix B: Specification 11-4-5.2 Response Time for-Batch CEMS. The response time requirement of 4.5.1 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling period and reporting of the sample analysis shall be no greater than one week hour. Sampling is also required to be continuous except that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or one hour five minutes, whichever is less.

CS3A-014 (5) The Specifications for CEMS should be modified so that continuous samplers with later analysis can be used in addition to the real time monitors tested. Continuous samplers give representative emissions determinations for PM and they appear to be feasible, since 3M Corporation uses a continuous sampler in Minneapolis, MN. Continuous samplers are direct measurements of PM emissions and give good long term average emissions levels. The proposed requirement to report CEMS analysis within one hour of sampling completion precludes the practical use of 3M style continuous samplers. A 12 hour averaging time requirement also make continuous samplers impractical. Continuous samplers are economical if weekly or monthly averaging times are used. PM from HWCs has not been associated with any acute health hazards and there is no justification for requiring immediate analytical results or for requiring short averaging times as discussed in comments and papers submitted on the HWC proposed rule by Kodak on August 19, 1996. Additionally, the problems with the accuracy of the PM real-time CEMS (discussed in Comments I and 2) may necessitate relatively long averaging times to help smooth data scatter. Therefore there is no advantage to requiring short reporting times for PM CEMS. The following change to the specifications for batch sampling PM CEMS to allow time for sample analysis is the key to allowing a continuous sampling method. This change should be made to proposed section 4.5.2 of Performance Specification 11 for PM in 40 CFR Part 60 Appendix B. Specification 11: 4.5.2 Response Time for Batch CEMS. The response time requirement of 4.5.1 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling period and reporting of the sample analysis shall be no greater than one week. Sampling is also required to be continuous except that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or one hour whichever is less.

CS6A-003 (5) The specifications for CEMS should be modified so that continuous samplers with later analysis can be used in addition to the real time monitors tested. Continuous samplers, as used by 3M in St. Paul, MN, give representative emissions determinations for both PM and metals. Continuous samplers are direct measurements of PM emissions and give good long-term average emissions levels. Continuous samplers have been reliable in 3M's application. The reliability of the PM CEMS was marginal during the EPA test and could be significantly worse for certain types of facilities. Therefore to ensure that some PM CEMS will work on all applications, it is important to write the rule in a way that allows continuous samplers to be a PM CEMS option.

The proposed requirement to report CEMS analysis within one hour of sampling completion precludes the practical use of 3M style continuous samplers. Continuous samplers are economical if weekly or monthly averaging times are used. PM from HWCs has not been associated with any acute health hazards and there is no justification for requiring immediate analytical results or for requiring short averaging times as discussed in comment 6. Additionally, the problems with the precision of the PM real-time CEMS (discussed in Comments 1 and 2) may necessitate relatively long averaging times to help smooth data scatter. Therefore there is no advantage to requiring short reporting times for PM CEMS.

CS6A-008 (5) The Final Rule Should Allow Use of Continuous PM Samplers...EPA's proposed CEMS specifications should be modified to allow the use of continuous samplers with later analysis. Continuous samplers, as used by 3M in St. Paul, Minnesota, provide representative emissions determinations for both PM and metals. Continuous samplers are direct measurements of PM emissions and give good long-term average emissions levels. Continuous samplers have been reliable in 3M's application... Therefore, to ensure that some PM CEMS will work on all applications, it is important to write the rule in a way that allows continuous samplers to be a PM CEMS option...

The proposed requirement to report CEMS analysis within one hour of sampling completion precludes the practical use of 3M-style continuous samplers. Continuous samplers are economical only if weekly or monthly averaging times are used...

Given these facts, no practical purpose is served by requiring (i) minute by minute measurements of PM stack concentrations, (ii) immediate analytical results, or (iii) short averaging times... In fact, the DuPont demonstration project identified problems with the precision of PM CEMS that may necessitate relatively long averaging times to help smooth data scatter... Alternative measures that analyze the mass emissions of PM over a longer period (e.g., a month) are fully adequate. In fact, mechanisms such as the 3M continuous stack samplers actually provide more precise measurements of PM, and exhibit fewer matrix interferences, than do CEMS.

CS6A-008 (5) Given these facts, no practical purpose is served by requiring (i) minute by minute measurements of PM stack concentrations, (ii) immediate analytical results, or (iii) short averaging times. ... In fact, the DuPont demonstration project identified problems with the precision of PM CEMS that may necessitate relatively long averaging times to help smooth data scatter. Therefore, there is no advantage to requiring short reporting times for PM monitoring. Alternative measures that analyze the mass emissions of PM over a longer period (e.g., a month) are fully adequate. In fact, mechanisms such as the 3M continuous stack samplers actually provide more precise measurements of PM, and exhibit fewer matrix interferences, than do CEMS.

CMA recognizes that such monitoring devices would not capture short term exceedances. As noted earlier, these are not relevant from a health perspective, since they cannot pose any acute health risk, and since they would have to be offset over the long term by emissions equally below the regulatory standard for the source to stay in compliance. To the extent that short-term emissions serve as an indication of good APCD operation, sources opting not to use CEMS could be required to monitor relevant APCD parameters to ensure that good operations and maintenance is maintained.

<u>Comment Summary</u>

Commenters believe continuous sampling methods are a CEMS and that certain aspects of the proposed performance specifications for MM CEMS preclude their use.

<u>Response</u>

EPA does not believe that continuous samplers described by commenters, such as methods that have become know as the "3M Method", are CEMS. The preamble to the final rule contains a full response to these comments. See section VII.C.5.a. of Part Five.

In summary, EPA defines a CEMS as equipment that obtains a sample, determines the concentration of the compound of interest, and reports the results in the units of the standard. Methods known as the "3M Method" are not CEMS because human intervention is necessary to extract, analyze, and report the results of the sample. Instead, the "3M Method" is a manual stack test method. (Commenters seem to agree on this point, hence the name they give it, "3M Method".) In particular, EPA notes that one of the key desirable elements of a CEMS is the quick turn-around afforded by the equipment. This allows many analyses to occur within the time frame of a single method analysis. This is turn brings about a control loop; when a facility approaches an emissions standard, the facility can act to prevent the exceedance from occurring in the first place. Methods, particularly those described by commenters where samples are extracted on the order of days, weeks, or months with analysis and results hours or days after the sample is obtained, do not bring about this key, "control loop" feature. Instead, it is an after the fact indicator of emissions with little ability to prevent an exceedance from occurring in the first place.

Comments predicated on the assertion that the "3M Method" is a CEMS are not relevant because the "3M Method" is not a CEMS. Making the changes to the performance specifications, appendix to Subpart EEE, etc., that commenters suggest will not make the "3M Method" a CEMS any more than painting stripes on a horse will make it a zebra.

3. Handling of Metals not Measured by a MM CEMS

Comment

CEM2.026(128) In addition, EPA has proposed that for those metals that may not be detectable by a multi-metal ("MM") CEMS (e.g., lead, cadmium, arsenic, beryllium, chromium, and antimony), the mass feedrate must be used in the emissions calculation with no allowance for removal efficiency of the air pollution control system ("APCS"). 17429. A similar approach is proposed to allow a waiver from the mercury CEMS requirement. 17520 (proposed § 63.1210(a)(3)). In other words, all metals fed to the combustion unit are assumed to be emitted in the stack gases.

This is an overly conservative approach which is not reflective of the "real world." Moreover, it would penalize those facilities that have well-designed, efficient APCS by forcing them to comply with the same conservative metal feedrate limitations as would apply to inferior facilities. This approach of assuming no partitioning of mercury also would discourage operators from choosing MM CEMS in lieu of operating parameter limits for metals, a result contrary to the Agency's professed preference for CEMS. To better reflect the actual performance of APCS, to provide an incentive for operators to maximize the removal efficiency of those systems, and to encourage operators to adopt MM CEMS as those devices become available, the final rule should be modified to allow for consideration of APCS removal efficiency in the establishment of feedrate limits for those metals that are not detectable by CEMS. In reality, removal efficiency can be easily demonstrated by spiking known amounts of components of interest and measuring the resulting stack emission. This efficiency can be considered a reliable factor in determining emissions. Alternatively, a facility should be allowed to use the removal efficiency for APCS as outlined by EPA (17430), or simply to translate similar metal emissions standards where metal volatility is similar. A similar approach should be adopted for purposes of the proposed mercury CEMS waiver provision.

CEM3.002(101)(e) In this case, the metals that cannot be detected by the CEM would be controlled through feed stream analysis. However, R-P does not agree that the full feed rate of the metal should count as the emission rate. Instead, the operator should be allowed the option of applying the removal efficiency for the metal as measured by the compliance performance test and/or trial bum.

CEM3.004(105)(b) We do not support, however, the concept that, for metals a MM CEMS cannot measure, a facility assume that all of that metal fed is emitted at the stack and that this metal feedrate be used in calculating the emissions for the metal group. This totally ignores the metal removal efficiency of the APC control system which can be demonstrated during the performance test or trial burn. Since the 1990 BIF rule (and earlier), HWCs have been permitted to back-calculate metal feed rates using emission data and demonstrated removal efficiencies. To discontinue the use of the removal efficiency factor would be overly conservative . Laidlaw recommends that the HWC operator be allowed the option of applying the removal efficiency for the metal as measured by the comprehensive performance test. The feed rate of the metal would be corrected for removal efficiency and the result would be added to the CEM reading to determine the overall emission rate.

CEM3.006(106)(b) However, ENSCO does not agree that the full feed rate of the metal should count as the emission rate. Instead, the operator should be allowed the option of applying the removal efficiency for the metal as measured by the compliance performance test and/or trial burn. The feed rate of the metal would be adjusted for removal efficiency and that result would be added to the CEM reading to determine the emission rate.

CEM3.009(117) 16. ISSUE: How to Address Metals That a CEMS May Not Be Able to Measure.

Rule Cite: The EPA has invited comment on how to address monitoring for metals that CEMS may not be able to measure. EPA has proposed two possible resolutions. One would be to assume that all of that metal fed is emitted at the stack, and that this metal feedrate will be used in calculating the emissions for the metal group. Alternatively, EPA could decide that a multi-metal CEMS which does not measure all the metals could not be used as CEMS for determining compliance with the SVM and LVM standards. (Proposed Rule, 61 FR 17429, Part Five, Paragraph IT.C.4.a.i.)

Comment: DoD is concerned about the proposed approach for estimating the emission of metals that a multi-metal CEMS cannot measure. The proposal states that facilities should assume that all of the unmeasurable metal fed is emitted at the stack, and that this metal feedrate be used in calculating the emissions for the metal group. This proposal seems to be in direct contradiction with information published in Volume IV of EPA's Hazardous Waste Incineration Guidance Series. Table III-8, "Conservative Estimated Efficiencies for Controlling Toxic Metals", states that air pollution control devices do remove some of the toxic metals. In light of such Agency guidance, DoD believes that at a minimum, allowance should be given for these conservative removal efficiencies. DoD also recommends that the multi-metal CEMS be required only if it can measure all of the different metals required for Hg, LVM and SVM. It places an undue burden on facilities to assume that all of the unmeasurable metals fed are emitted. The MACT standards are extremely low, and if any characterized, unmeasurable metal is in the feedstream, the ultra-conservative approach proposed by EPA will likely cause the standard to be exceeded. If a multi-metal CEMS that cannot measure all metals is required, an alternative solution should be developed to estimate emissions of unmeasurable metals.

DoD Recommendation: In the absence of metal CEMS, the metal emissions rate be calculated as (the metal feed rate)*(i-efficiency of metal removal), as given at Volume IV of the EPA Hazardous Waste Incineration Guidance Series, Table III-8, “Conservative Estimated Efficiencies for Controlling Toxic Metals”. in addition, EPA require a multi-metal CEMS only if it can measure all metals of concern (e.g. Hg, LVM and SVM) that are required to be measured.

CEM3.010(124) 5.II.C.4.b.i. How to Address Metals that a CEMS May Not Be Able to Measure

EPA requested comment on whether a multi-metal (MM) CEMS which does not measure all metals can be used so long as the facility assumes that all metal fed is emitted at the stack and the total metal feedrate is used to calculate emissions for the metal groups (61 FR 17429).

DOE believes that the list of metals which can be regulated under the MM CEM performance specification (PS) conforms to the list of metals regulated under the BEF rule, and not to the list set in this proposed rule. DOE suggests that EPA clarify that the PS for the MM CEM applies only to regulated metals under the proposed rule.

DOE further suggests that EPA clarify that “all metal feed” means all metal feed that is not being measured by a CEM. EPA may wish to consider that ratios of feed metals (semi-volatile or low-volatile) to emitted metals be established during the performance test. These data could be correlated to CEM data to project emission levels for the non-CEM metals.

CEM3.012(128) In addition, EPA has proposed that for those metals that may not be detectable by a multi-metal (“MM”) CEMS (e.g., lead, cadmium, arsenic, beryllium, chromium, and antimony), the mass feedrate must be used in the emissions calculation with no allowance for removal efficiency of the air pollution control system (“APC”). 17429. A similar approach is proposed to allow a waiver from the mercury CEMS requirement. 17520 (proposed § 63.1210(a)(3)). In other words, all metals fed to the combustion unit are assumed to be emitted in the stack gases.

This is an overly conservative approach which is not reflective of the “real world.” Moreover, it would penalize those facilities that have well-designed, efficient APCS by forcing them to comply with the same conservative metal feedrate limitations as would apply to inferior facilities. This approach of assuming no partitioning of mercury also would discourage operators from choosing MM CEMS in lieu of operating parameter limits for metals, a result contrary to the Agency’s professed preference for CEMS. To better reflect the actual performance of APCS, to provide an incentive for operators to maximize the removal efficiency of those systems, and to encourage operators to adopt MM CEMS as those devices become available, the final rule should be modified to allow for consideration of APCS removal efficiency in the establishment of feedrate limits for those metals that are not detectable by CEMS. In reality, removal efficiency can be easily demonstrated by spiking known amounts of components of interest and measuring the resulting stack emission. This efficiency can be considered a reliable factor in determining emissions. Alternatively, a facility should be allowed to use the removal efficiency for APCS as outlined by EPA (17430), or simply to translate similar metal emissions standards where metal volatility is similar. A similar approach should be adopted for purposes of the proposed mercury CEMS waiver provision.

CEM3.015(141) G. EPA's Proposed Feedrate Limits for Metals and Mercury Overly Conservative and Must be Modified

EPA has proposed that for those metals that may not detectable by a multi-metal ("MM") CEMS (e.g.,lead, cadmium, arsenic, beryllium, chromium, and antimony), the mass feedrate must be used in the emissions calculation with no allowance for removal efficiency of the air pollution control system ("APCS"). 61 Fed. Reg. at 17,429. A similar approach is proposed to allow a waiver from the mercury CEMS requirement. Id. at 17,520 (proposed Section 63.1210(a)(3)). In other words, all metals fed to the combustion unit are assumed to be emitted in the stack gases.

This is an overly conservative approach which is not reflective of the "real world." Moreover, it would penalize those facilities that have well- designed, efficient APCS by forcing them to comply with the same conservative metal feedrate limitations as would apply to inferior facilities. EPA's proposed approach also would discourage operators from choosing MM CEMS (if indeed such CEMS were available) in lieu of operating parameter limits for metals, a result contrary to the Agencies professed preference for CEMS. To better reflect the actual performance of APCS, to provide an incentive for operators to maximize the removal efficiency of those systems, and to encourage operators to adopt MM CEMS as those devices become available, the final rule should be modified to allow for consideration of APCS removal efficiency in the establishment of feedrate limits for those metals that are not detectable by CEMS. A similar approach should be adopted for purposes of the proposed mercury CEMS waiver provision.

CEM3.023(181) VI. Eastman Opposes the Option That All Metals Fed to a Unit Are Emitted at the Stack

At 61 FR 17429, EPA states that "MM CEMS cannot be used to document compliance for a metal it cannot measure" and proposes that facilities assume that all metals not directly measured by an MM CEM which are fed to a combustion unit can be "assumed" to simply be emitted at the stack. If EPA does not reevaluate its position with regard to the value of MM CEMS in monitoring groups of chemically similar constituents, the regulated community will never be provided an incentive to work with the manufacturers and the Agency to develop effective, purposeful monitoring equipment. We ask that EPA commit to the evaluation of truly reliable, effective CEMS which will be indicative of system performance based on the realistic risks posed by groups of constituents of concern. Eastman continues to support the use of CEMS which can be used to accomplish this objective because real time emission results are of benefit to the owner/operator, the Agency, and the public. It simply must be practical.

In lieu of such evaluations, Eastman strongly believes the Agency should allow a facility to use feed parameter and removal efficiencies as a method of compliance for metals the CEM will not measure. An owner/operator could demonstrate removal efficiencies of its specific pollution control equipment or at a minimum apply EPA's own published removal efficiencies to those metals not specifically measured by MM CEMS.

CEM3.027(191)(b) 83. Page 329 If a multi-metals CEM cannot measure a metal of concern then it should not be used for determining compliance of that metal.

CEM3.030(203) Part Five II. C. 4. b. i. How to Address Metals that a CEMS May Not Be Able to Measure.

Proposal: For metals that a multimetal CEM cannot measure, EPA is proposing that facilities assume all of that metal fed is emitted at the stack, and that this metal feedrate be used to calculate emissions for the metal group. EPA invites comment on how to address this issue.

Comment: HWP acknowledges this approach would work well for homogenous, liquid hazardous waste, however, metals concentrations in a solid waste stream could be quite difficult to quantify unless the stream was also homogeneous. This approach would allow facilities to purchase less expensive CEM equipment that does not measure each SVM or LVM, and still maintain adequate emissions control.

CEM3.NOD.002(233) 5.II.C.4.b.i. How to Address Metals that a CEMS May Not Be Able to Measure: EPA requested comment on whether a multi-metal (MM) CEMS which does not measure all metals can be used so long as the facility assumes that all metal fed is emitted at the stack and the total metal feedrate is used to calculate emissions for the metal groups (61 FR 17429). DOE believes that the list of metals which can be regulated under the MM CEM performance specification (PS) conforms to the fist of metals regulated under the BIF rule and not to the list set in this proposed rule. DOE suggests that EPA clarify that the PS for the MM CEM applies only to regulated metals under the proposed rule. DOE further suggests that EPA clarify that "all metal feed" means all metal feed that is not being measured by a CEM. EPA may wish to consider that ratios of feed metals (semi-volatile or low- volatile) to emitted metals be established during the performance test. These data could be correlated to CEM data to project emission levels for the non-CEM metals.

<u>Comment Summary</u>

Commenters summarized how they would like EPA to deal with circumstances where a MM CEMS measures some, but not all the metals that comprise the LVM and SVM standards.

<u>Response</u>

EPA notes the commenters suggestions, but believes any decisions concerning this issue are best left to the facility wanting to use the CEMS and its permitting authority. However, EPA does insist that some methodology be worked out to ensure that all metals which comprise the SVM and LVM standard are accounted for in the reported result. EPA appreciates suggestions that this be done through feedstream monitoring of the metals not measured, coupled with some APCD or system removal efficiency determined by other metals in the SVM or LVM group.

EPA notes that this issue largely comes about because the x-ray fluorescence analytical technique does not measure beryllium. This problem can be overcome by using an analytical technique that does measure beryllium, such as laser spark.

4. <u>MM CEMS Testing (General)</u>

Comment

CEM3.016(143) 4.0 Metals Spiking One of the advantages EPA extols for the mercury and multi-metals CEM is the reduction in the risk experienced by the testing crew. Specifically, the EPA has stated in the preamble to the HWC regulation Part 5, section II(C)(4)(b) "Finally, the common process of spiking metals during compliance testing to ensure an adequate operating envelope is expensive, potentially dangerous to the testing crew that must handle the toxic metals, and causes higher than normal emission rates during compliance testing. If a MM CEMS were available, there would not be a need to spike metals during compliance testing." Clearly, EPA evidences no equivocation here on two points:

1) That metals spiking is a risk to human health and the environment, and
2) That MM CEMS will eliminate the need for spiking.

On the first there can be no argument, this is a position taken by virtually everyone in the industry. On the second however, the EPA is at best being naive and clearly has not closely examined their own propose.

The testing requirements for the mercury and MM CEMS require that both the specified standard method, Method 29, and the CEM instruments measure the concentration of the metal being monitored at a level above the lower detection limit. (See Performance Specification 10, Section 7.)

To comply with this provision, any given facility will perform metals spiking for the metals intended to be monitored. This statement can be made based on a simple examination of recent test data. The system removal efficiencies for most of these metals (arsenic, beryllium, and chromium in particular) have very high values commonly 99.99 plus percent. In some cases, even though the facility -had spiked metals at BIF COC allowable rates, the emission values were below the lower detection limit for Method 29. With such being the case, EPA's assertion that MM CEMS will eliminate the need to spike metals is not substantiated. If the EPA is concerned with eliminating metals spiking and reducing risks to human health and safety, as they should be, then now is the time to do it! In a communication dated November 9, 1995 from Michael Shapiro to David Gossman it was stated, "Generally, SRE decreases at lower feed rates." What this means is that by conducting COC testing at normal metal feed rates (i.e. without spiking), the SRE values would be lower than with metals spiking. Using these SRE values, the facility could then calculate metal feed rates (by using EPA's conservative models) that are more protective of the environment than by using the SRE values that would be obtained during testing with metals spiking. This eliminates the need for spiking metals and produces a more conservative (i.e. protective of the environment) metals input limit. EPA has a legislated responsibility to act to protect human health and safety, and as such should implement an emergency rulemaking eliminating metal spiking requirements.

The data contained in the technical background documents, Volume IV, does not include any operational data of a mercury or MM CEMS installed at a cement kiln. Without being able to assess such data it is unreasonable to assume that the detection limit of the MM CEM will be as low as Method 29. If this CEM detection limit is one order of magnitude higher than Method 29 then the metal input for a metal intended to be monitored must also be one magnitude higher as well.

Additionally, EPA's promotion of technologies to produce even lower particulate emission values will lead to higher system removal efficiencies. This means that even more metals may have to be spiked to achieve stack emission values for the target metals that are higher than the lower detection limit for Method 29 or the CEM. In addition to this, the Performance Specification (PS 10) for the @ CEM also requires a relative accuracy test for one of the metals or iron over three ranges 0-20, 40-60, and 90- 1 20 percent of the emission limit. Iron is an ingredient in the raw feed of cement kilns at about 2%. Too little or too much iron will affect the product quality of the cement consequently it is highly unlikely that a cement kiln would or even could adjust the iron input rate to produce three levels of iron emissions for CEM Method 29 comparison. Consequently, in order to produce the three levels, one of the monitored metals must be selected; then to achieve the desired control, it would be spiked. It is therefore likely that the HWC test requirements will actually increase the spiking of metals rather than eliminating such spiking as the EPA has stated in the preamble to HWC. GCI objects to this false and totally unjustified approach to regulations as proposed by EPA.

CEM3.017(143) EPA touts the use of Multi-metals (MM) CEMs as a way of doing away with "spiking metals during compliance testing" and hence the potential risk to human health and the environment due to such activities. This is incorrect based on the requirements in Performance Specification 10. (PS10 - these specifications may be found on 40CFR Part 60 Appendix B, see FR17495). Metals solutions, or something not currently specified, will have to be injected into the CEM sampling system every year to perform the Absolute Calibration Audit (ACA). Also, every three years the facility must recertify the MM CEM. To do so requires that for each metal to be monitored the concentration in the stack gas must be above the level of detection for both the reference method and the MM CEM. (See PS 10, Sec. 7.1) In this case, the spiking may be done at lower (or in some case higher) input rates than that performed for COC Tests, but it will likely continue for a longer period, perhaps more than a week.

CEM3.018(143)

Parameter	BIF Requirement	HWC Requirement
Metals	No CEM Required.	1. Install and check out. 2. Conduct 7 Day CD/ZD Test (<5% of limit) - Includes response time test. 3. Conduct Instrument/M29 Relative Accuracy Test for each metal monitored at a single level and for 1 metal at 3 levels. 3 sets for each metal, 3 sets for each level (for 3 level metal) requires O_2 and moisture. No "non-detects" for CEM or M29 are allowed - may require spiking. 4. Calculate accuracy, deviate <20% of reference method, <10% of limit.

CEM3.021(170) EPA suggests that multi-metal CEMS can be used as a way of discontinuing "metals spiking during compliance testing." (61 FR 17429, col. 2) However, this is an inaccurate representation. According to the requirements in Performance Specification 10 (61 FR 17495),(196) metals solutions — or something not currently specified — will have to be injected into the CEMS sampling system (over-board calibration) every year to perform the Absolute Calibration Audit (ACA). Also , every three years the facility must re-certify the multi-metal (MM) CEM. To do so

requires that for each metal to be monitored, the concentration in the stack gas must be above the level of detection for both the reference method and the MM CEM [Footnote 197: 40 CFR Part 60, Appendix B; 197 PS 10, Section 7.1]. In this case, the spiking may be done at lower, but in some cases higher, input rates than that performed for COC tests. The spiking must continue for a longer period, perhaps more than a week. The Agency should consider that the proposed requirement may be counter-productive. The emissions of metals during a week-long period of CEM calibration with extended periods at the high or mid-span metal emissions rates likely will exceed the total normal day-to-day emissions of a facility over several months.

CEM3.022(170K) METAL CEMS

Trace metal CEMS calibration is to be carried out using manual sampling and RATA. Such systems are calibrated over a range of operating conditions. The proposed Performance Standard for metals CEMS states that measurements should be taken at 0-20; 40-60; and 80-120% of the standard. This implies that for LVM the values should be <26 μg/dscm; between 52 and 78 μg/dscm and >104 μg/dscm total for all species. While the upper ranges of these are likely easily measured, Method 29 certification data presented in Appendix C indicates that the MQL for LVMs is 16.5 ug/m^3 . The sampling limits of the method are being pressed. For the SVMs the proposed limit is 57 ug/m^3 which implies that the lower range would be <12 ug/m^3 which is at the MQL for these materials. Calibration will be problematic at best and longer than costed sampling times will likely be required since test results used for instrument calibration should be above the Method Quantitation Limit if they are to have any reasonable accuracy.

Blank train results are frequently on the same order of magnitude as the sample values of Method 29 at incineration sources. Unless Method 29 is modified to subtract Method blanks, and not just filter and reagent blanks, the resulting calibration will be meaningless.

For both the PM and Metals CEMS calibrations, it will likely be necessary for facilities to develop a means of raising stack concentrations to the high end of the calibration range. There is a potential for several problems, not the least of which is distortion of the normal performance of the facility over an extended period of time following the testing as the dust residue built up in the breachings downstream of the mis-operated APCS passes out of the system. At the Southeast Resource Recovery Facility in Long Beach, CA, opacity values (while still less than 10 percent of any regulatory standard) would take 12 to 60 hours to return to normal after a failed bag was isolated. In the case of Metals CEMS calibration contamination, especially with the possibility of enforcement actions or citizen suites, it is recommended that the data be considered invalid for at least a week after the conclusion of testing.

Further, because of the carry-over problem, it is recommended that testing be conducted in a clean to dirty order. While this is bad experimental practice, it may not be possible to achieve low-end calibration with residual dust in the system. Testing should commence at the lowest level that the plant can achieve with its APCS.

EPA must also consider the action it will take if the facility physically produce a concentration that is 20% of the SVM or LVM standard. It should be noted that regulators outside the EPA do not always see any flexibility in EPA Performance Standards and try to enforce them to the letter of the rule, rather than the spirit; consequently, explicit resolution of such problems is necessary to prevent inadvertent and unintended consequences.

Having accomplished the high end testing, other testing will then need to be delayed for at least 24 hours if not up to 2 - 3 weeks to allow the system to re-equilibrate. The emissions control performance of the system has been purposely impaired to produce high emissions. During that time materials have likely been deposited on the wall of the ductwork in and after the APCS. As was witnessed in the Montgomery County testing conducted by the EPA and was also observed by Born et al during testing of the AVI Amsterdam (North) facility and DK Tecknique during the testing at Horsholm, Denmark, it takes time after system conditions have changed for emissions to return to equilibrium values.

CEM3.024(181) VII. Operating Experience Demonstrates that Spiking Metals During Compliance Testing is a Necessary Component of Compliance Testing

At 61 FR 17429, EPA concludes that the availability of MM CEMS would eliminate the need to spike metals during compliance testing to ensure an adequate operating envelope. EPA states that such spiking is “expensive, potentially dangerous to testing crews that must handle the toxic metals, and causes higher than normal emission rates during compliance testing”. Eastman strongly disagrees with this position. For any incineration unit to operate within the necessary compliance restrictions and still maintain efficient operations with a goal of efficiently and effectively treating hazardous wastes, the owner/operator must know the correlation between actual feedrates and the response of the MM CEM. Ultimately from an operations standpoint, metals emissions will be controlled by the rate of feed of both solids and liquids for such units as rotary kilns. The MM CEM is merely a monitor to confirm the effective operation of the units. Eastman believes that EPA would also want to establish the correlation between feedrates and MM CEM response for individual units as well. If this correlation is not developed, there is little reason for the analyses of waste streams for metals. Certainly, the incinerator operator is not simply going to feed wastes in the hope that limits will not be exceeded and adjust feed rates on the “after treatment” response of the MM CEM. Spiking of feeds during compliance testing is essential for the owner/operator to understand the characteristics of the specific combustion unit, control equipment, and monitoring equipment. Expense of trial burns has never been a concern of EPA’s in Eastman’s experience and attention is always given to the safety of its personnel whether wastes are being managed or spiking materials are being managed. EPA also provides no data to indicate that the spiking/trial burn process is a significant threat to human health and the environment. It is certainly not a long term threat.

CEM3.029(208) Comment 4: CEMS Requirements

In Part 60, Appendix B of the proposed rule, EPA describes the installation and calibration of various continuous emission monitors (CEMs). Within the appendix, the following requirements are listed:

1. Performance Specification 10, Section 7.6 (p.17501): If metal emission concentrations are nondetectable, then spiking of metals will be required to a level detectable for both the CEMS and RM in order to perform the RA test.

The Demopolis plant has conducted metal spiking during its two BIF Rule required compliance tests and has experience with such spiking. The spiking of metals into the feedstreams of a cement kiln can only be performed with considerable care and incurs significant expense. It also increases emissions of the metals over the levels that normally occur.

Medusa-Citadel, Inc. acknowledges the importance of adequate calibrations for CEMS. However, the requirement to spike metals, and thereby increase emissions of these substances, is contrary to the goal of minimizing overall emissions.

In the preamble, EPA acknowledges that multiple metal CEMS have not yet been proven in routine operation of combustion devices. Medusa-Citadel, Inc. suggests that EPA identify alternative methods of conducting calibrations of such devices rather than artificially increasing emissions for the only benefit of calibrating a monitor.

<u>Comment Summary</u>

Commenters suggest concerns including:

- Using a MM CEMS does not circumvent metals spiking;
- A summary of the MM CEMS test requirements, compared to those found in the BIF rules; and
- PS10 performance specifications..

<u>Response</u>

EPA believes using a MM CEMS will circumvent the needs to spike metals. Metals concentrations would be determined by using metals solutions injected into the analyzer, not by spiking metals in the feed to cause high stack metals concentrations. Far fewer metals would be emitted, and none spiked in the process feed, if MM CEMS are used.

EPA concurs with the summary of test requirements provided by the commenter.

EPA is not prepared to promulgate PS10, the performance specification for MM CEMS. Instead, it believes the performance criteria should be based on what is demonstrated to be achievable at the source wishing to use a MM CEMS. Therefore, EPA believes issues specific to PS10 are best left to the facility wanting to use a MM CEMS and its permitting authority. See section 8 issue 1 of this volume of the Technical Response Document for more information on this topic.

Hydrochloric Acid and Chlorine Gas CEMS

1. HCl/Cl_2 CEMS Use (General)

Comment

CEM4.001(083) 15 pg 17434, column 3 - states that incinerators must add a chlorine CEMS and states that it is made by a European company called Opsis. Our comment here is the same as comment 13 (pg 17427) above.

CEM4.006(114) CRWI agrees with EPA and does not see the need for both feed rate restriction on chlorine and a requirement for a HCl/Cl_2 CEM. Requiring both would not increase the Agency's ability to monitor compliance but would increase the cost to that facility. There is also a question of availability and workability in all units.

CEM4.008(124)(b) DOE believes that the use of feed analysis and monitoring of scrubber operational parameters should make HCl and Cl_2 CEMS redundant. DOE suggests EPA consider making these CEMS optional.

CEM4.009(124) 5.II.C.6.c.ii. Cl_2 CEMS EPA explains that incinerators must add a chlorine CEMS and states that one is made by a European company called Opsis (61 FRR 17434, col. 3).

DOE's comment here is the same as #2 under comment 5.II.C.3.a.2. [I.e., "DOE questions the appropriateness of crafting regulations that require facilities to add monitoring equipment that 1) is made outside the USA , and 2) appears to be a offered by a limited number of companies. DOE suggests EPA evaluate other RCRA uses of the term "available" such as under the land disposal restriction program."]

CEM4.012(130) We agree with EPA's conclusion not to mandate the use of CEMs for chlorine. We agree that feedstream monitoring will still be required for control of LVM and SVM emissions, therefore making the use of CEMs an unnecessary additional burden.

CEM4.018(153)(a) B. Continuous Emission Monitoring System (CEMS) (61 Fed. Reg. at 17,433)

If the Agency does not provide HCl and Cl_2 waiver provisions in the final rule, CWM recommends the thorough testing, installation and use of a reliable and accurate CEM as outlined in the Agency's proposal. Through the utilization of a CEM, a direct assurance of compliance with an emission standard can be demonstrated, avoiding the establishment and imposition of arbitrary operating parameters which can, in many instances, conflict with other operational conditions to cause unsteady-state operations with no guarantee of emission standard compliance. Additionally, CWM strongly believes that where CEMs are mandated or optionally used, there should be no front- end operational constraints, such as feed rates or extraneous APC monitoring/control parameters, due to their redundant and arbitrary nature.

CEM4.019(163) HYDROGEN CHLORIDE/CHLORINE CONTINUOUS EMISSION MONITOR

Medusa-Crescent also believes that the requirement of HCl/Cl_2 CEM which has not been proven effective oh cement kilns is unduly burdensome and unnecessary and should be removed. Four different test data for which have been filed with the EPA have indicate that complying to the proposed HCl/Cl_2 emission standard under the proposed rule is not a problem even when the systems are stressed as it is required for COC testing. Further, the cement chemistry limits the amount of HCl/Cl_2 that can be fed to a cement kiln before production and product quality-problems are encountered. This imposes the primary limit on HCl/Cl_2. feed/emission limit on a cement kiln rather than any regulatory or health risk-based limit. The feed rate of HCl/Cl_2 is continuously monitored as a part of the BIF regulation requirements and should be sufficient to demonstrate compliance to the HCl/Cl_2 standard. The feed rates of HCl/Cl_2 at Medusa-Crescent cement kilns seldom exceeds half of the HCl/Cl_2 allowable amounts because of product quality and operational concerns. Also, it should be noted that a recent study on HCl/Cl_2 emission from cement kilns that do not burn hazardous waste indicate that HCl/Cl_2 emission can be attributable to naturally occurring raw materials and coal.

CEM4.021(170)(a) F. EPA should delete its proposed requirements for HCl and Cl_2 Monitors Cement Kilns

In the HWC MACT proposal (61 FR Part Four, B.3, 17376), EPA notes that concerns have been expressed about the suitability of Method 26A particularly regarding the penetration of metallic salts through the filter and their subsequent measurement as HCl. The Agency invited comment on this issue.

1. CKRC believes there is no need for HCl monitors since the best evidence is that the majority of cement kiln Cl emissions are ammonium chloride, which is not a HAP. The interference section of Method 26, the reference test method for both HCl and Cl_2, [Footnote 200: 40 CFR 60 Appendix A, Method 26] states that ammonium chloride is a method interferent. Review of available test data shows enough ammonium ion in the impingers to account for at least half of the measured chlorides.
2. Reliable HCl monitors are very expensive and EPA has not considered these monitors. Instead EPA costed-out systems that historically have not worked in North America.

CEM4.021(170)(c) Therefore, CKRC urges the Agency to remove the requirement for HCl and Cl_2 monitors from the proposed HWC MACT. CKRC also fully supports the comments of the American Portland Cement Alliance regarding this topic.

CEM4.022(170K)(d) A system that uses a wet scrubbing to capture HCl for analysis will be suspect at a cement kiln for the same reasons as difficulties exist with Method 26/26A. As noted in the method itself and by L. Johnson of EPA's methods development laboratory, ammonium chloride is an interferent. EPA's own testing demonstrates that ammonium chloride is emitted from cement kilns. Consequently, Method 26 can be relied upon to provide a site-specific relative indication of total chlorides emissions, but the actual emission is some unknown mixture of total HCl, Cl_2 and ammonium chloride. It is not a good measure of HAPs.

CEM4.024(175)(b) Glaxo Wellcome Inc. currently operates an HCl monitor at a solid hazardous waste incinerator which over the past year has been out of service for approximately 30% of the time.

Glaxo Wellcome Inc. has also been unsuccessful in locating a service company (including the CEMs manufacturer) which can adequately provide maintenance and trouble shooting support for this systems.

CEM4.025(182)(b) Finally, Dow agrees with EPA and does not see the need for both feed rate restriction on chlorine and a requirement for a HCl/Cl_2, CEM.

CEM4.026(183) 3M believes that there is no need for both feed rate restrictions on chlorine and requirements for a HCl/Cl_2 CEM. Requiring both does not improve the agency's ability to monitor compliance but rather only increases the facility cost. The 3M incinerator operates a wet APC system which routinely provides a very high HCl/Cl_2 removal efficiency. In this case there is no justification to require HCl/Cl_2 CEMs.

CEM4.027(187) 3. Hcl/Cl_2 Solite has conducted numerous attempts to continuously monitor HCl emission during compliance tests using a CEM. In every one of these attempts there have been problems with obtaining continuous and reliable results. There have been significant disparities between the results from the wet chemistry performed on samples collected during the compliance test and the CEM results.

CEM4.029(204) 8.7 HCl and Cl_2 CEMS Fina does not support the mandatory use of the HCl and Cl_2 CEMS as discussed on page 17433. EPA is already too ambitious with the proposed requirements for PM, HC and Hg CEMS. Implementation of these monitors is uncertain enough without compounding the issue with another mandatory CEMS.

CEM4.NOD.001(233) 5.II.C.6.c.ii. Cl_2 CEMS EPA: explains that incinerators must add a chlorine CEMS and states that one is made by a European company called Opsis (61 FRR 17434, col. 3). DOE's comment here is the same as #2 under comment 5.1l.C.3.a.2.

Comment Summary

Commenters favor EPA's proposal that HCl and Cl_2 CEMS not be required for the final rule since feedrate and operating parameter limits would be required for compliance with the metals standards anyway. Other issues include:

- EPA proposed requiring HCl and Cl_2 CEMS, and should provide waivers for this requirement;
- EPA proposed requiring a device from a specific manufacturer;
- Systems that use wet scrubbing for HCl capture have the same problems as M26/26A, and is a measure of HCl, Cl_2, and ammonium chloride emissions; and
- HCl CEMS have high downtime, and previous attempts to use HCl CEMS have been unsuccessful.

Response

EPA agrees with commenters that it should proceed as proposed and not require HCl or Cl_2 CEMS.

EPA did not propose requiring either HCl or Cl_2 CEMS.

EPA did not propose requiring a device made by a specific manufacturer.

Today's standards account for any alleged ammonium chloride bias caused by Method 26A. The standards were based on data collected using Method 26A, so any resulting bias is included in the promulgated standard.

EPA notes the operational difficulties stated by comments support EPA conclusion not to require HCl CEMS.

2. HCl/Cl_2 CEMS Testing (General)

Comment

CEM4.014(143)

Parameter	BIF Requirement	HWC Requirement
Hydrogen Chloride	No CEM Required.	1. Interface Response Test, deviate <2% of limit. 2. Install and check out. 3. Calibration Error Test - included Response Time Test, deviate <2.5% of span. Requirement for O_2 and moisture not mentioned. 4. Conduct 7 day CD/ZD Test, deviate < 2.5% of span on 6 of 7 days.
Chlorine	No CEM Required.	1. Install and check out. 2. Conduct Calibration Error Test, deviate <15% of reference. 3. Conduct interference response test, deviate <2% of limit. 4. Conduct 7 day CD/ZD Test.

CEM4.015(143) 3.0 Chlorine and Hydrogen Chloride CEMS The proposed HWC regulation requires that cement kilns control chlorine and HCl emissions via chlorine feed rate limits. This is the current BIF method. Alternatively, the facility may install chlorine and hydrogen chloride CEMS. The performance specifications (PS13 and PS 14) for these CEMS are very similar. There is nothing remarkable in these specifications that requires comments. The interesting point with respect to cement kilns is that the current manual stack sampling and analysis method does not differentiate between HCl and volatile salts containing chloride. Consequently, a significant portion of the data that the EPA has on HCl emission from cement kilns is not really HCl at all. Since virtually all kilns can meet the MACT standard as currently configured, it is highly unlikely that any facility will entertain the cost or the trouble to install a CEM to monitor either of these gases and will instead rely totally on chlorine feedrate limits. With the Montreal Accords restricting the use of fluoro/chloro compounds, combustible hazardous waste contains less and less chlorine each year. Consequently, cement kilns rarely approach chlorine feed rate limits set during a performance test.

CEM4.016 C. Chlorine and Hydrogen Chloride CEMS The proposed regulation requires that cement kilns control chlorine and HCl emissions via chlorine feed rate limits. This is the current BIF method. Alternatively, the facility may install chlorine and hydrogen chloride CEMS. The performance specifications (PS 13 and PS 14) for these CEMS are very similar. There is nothing remarkable in these specifications that requires comment. The interesting point with respect to cement kilns is that the current manual stack sampling and analysis method does not differentiate between chlorine and salts containing chloride. Consequently, a significant portion of the data that the EPA has on HCl emission from cement kilns is not really HCl data. Since virtually all kilns can meet the MACT standard as currently configured, it is highly unlikely that any facility will entertain the cost or the trouble to install a CEM to monitor either of these gases and will instead rely totally on chlorine feedrate limits. Since the advent of the Montreal Accords restricting the use of fluoro/chloro compounds, combustible hazardous waste contains less and less chlorine each year. Consequently, cement kilns rarely approach chlorine feed rate limits set during a performance test.

CEM4.022(170K)(b) Relative Accuracy tests for HCl monitors is another concern. One critical element is daily calibration. Calibrating the unit against a gas of known concentration provides a good place to start. Unfortunately, there is a problem with the stability of HCl calibration gas. Moisture and cylinder wall effects can cause a HCl 'loss' over time and prudent field test teams get freshly certified calibration gasses for each test. The Agency must develop demonstrations that stable calibration gasses are available. The cost proposed for operating these systems does not assume that cylinders can only be used to half capacity . These problems and others were experienced over a period of one year while trying to bring a dilution based HCl analyzer system into compliance with 40 CFR 60 Appendix F equivalent procedures at the Peel Facility in Brampton, Ontario, Canada [Footnote 15: Personal communications, A. J. Chandler to H. G. Rigo, June 1992-September 1994.]. This system was replaced by a Bodenzeewerk HCl analyzer in early 1995 after repeated failures to achieve calibration.

Comment Summary

Commenters addressed issues related to the proposed PS 13 for HCl and PS 14 for Cl_2. Other issues include:

- A comparison of the proposed test requirements for HCl and Cl_2 CEMS to what is required by the BIF rule;
- Cement kilns rarely feed as much chlorine as their permits allow; and
- Problems encountered using HCl calibration gases.

Response

EPA has decided not to promulgate PS13 or 14. See section 8 issue 1 of this volume of the Response to Comments Document for a full response to this comment.

EPA agrees with the comparison of the BIF and proposed HWC test requirements for HCl and Cl_2 CEMS, but notes that those requirements would be effective only if a facility chose to use a CEMS.

EPA notes the commenter's statement that cement kilns rarely feed as much chlorine as their permits allow. This supports that lower chlorine feed limits, and hence lower standards, are achievable.

Finally, EPA notes that comments relative to previous experiences using HCl CEMS support our final decision not to require HCl CEMS.

3. Use HCl CEMS Only for HCl/Cl_2 Standard

Comment

CEM4.002(084)(a) II.C.6 Hydrochloric Acid (HCl) and Chlorine (Cl_2) The proposal to use HCl and Cl_2 CEMS separately to measure respective emission rates seems to be the best way to go. However, facilities should be given options to determine which method is appropriate and cost effective for their facilities.

CEM4.005(106) ENSCO does not feel that the rule should require separate CEMs for HCl and Cl_2, but allow use of HCl CEMs as a surrogate also for Cl_2. ENSCO agrees that this cannot be allowed uniformly for all processes in the final rule, due to the variation in relative HCl and Cl_2 emissions from process to process. EPA could however, provide an allowance in the final rule for a facility to demonstrate on a site-specific basis, what the correlation between HCl and Cl_2 emissions is. An HCl monitor could be operated during a correlation test, during which chlorine is spiked at several different levels in the feed, up to the maximum desired chlorine feed rate. During this test, an HCl CEM would be operated, simultaneous with manual stack tests for HCl and Cl_2, with three runs per each spike level. The manual emissions data could be reviewed against the CEM readings. If a correlation can be established between the CEM readings, and total HCl and Cl_2 emissions measured manually, then a given facility should be afforded the option of using an HCl CEM on a site specific basis, as a monitor for both HCl and Cl_2.

CEM4.013(130) The ETC does not feel that the, rule should require separate CEMs for HCl and Cl_2, but should allow use of HCl CEMs as a surrogate for Cl_2. The ETC agrees that this cannot be allowed uniformly for all processes in the final rule, due to the variation in relative HCl and Cl_2 emissions from process to process. EPA could, however, provide an allowance in the final rule for a facility to demonstrate the correlation between HCl and Cl_2 emissions on a site-specific basis. The HCl monitor could be operated during a correlation test, during which chlorine is spiked at several different levels in the feed, up to the maximum desired chlorine feed rate. During this test, an HCl CEM would be operated simultaneously with manual stack tests for HCl and Cl_2, with three runs per each spike level. The manual emissions data could be reviewed against the CEM readings. If a correlation can be established between the CEM readings and total HCl and Cl_2 emissions measured manually, then a given facility should be afforded the option of using an HCl CEM as a monitor for both HCl and Cl_2.

CEM4.017(152) We also question the need for HCl CEMS. Experience indicates that emissions of chlorine generally occur as Cl_2, not HCl, and there is no correlation between the small amount of HCl and Cl_2 generated. Consequently, Shell finds the requirement for HCl CEMs to be without merit and unnecessary.

CEM4.018(153)(b) Due to the lack of a commercially available and reliable Cl_2 CEM, CWM requests that the Agency allow the sole use of a HCl CEM to measure the level of both compounds. HCl CEMs are used extensively and are proven both from a reliability and accuracy standpoint. If an existing facility has invested the up-front capital and continual resources to install and maintain these instruments, their continued use should be allowed, especially since commercial Cl_2 monitors are not currently available.

A review of trial burn results from CWM's TWI incineration facility demonstrates that HCl emissions are detected at a ratio of 1 g/min HCl to 0.0057 g/min Cl_2, indicating that HCl is the much more prevalent species, by over several orders of magnitude. At CWM's Port Arthur incineration facility, there is substantial trial burn stack emissions data (> 12 HCl/Cl_2 sets Of data points from trial burns that analyzed for each compound from the same stack sample) for varying operating conditions that indicate good HCl/Cl_2 correlations. The Agency's contention that HCl/Cl_2 post-combustion equilibrium conditions favor Cl_2 formation over HCl must not lose sight of the fact that rate of formation reaction is controlled by kinetics. The HCl/Cl_2 equilibrium is not a rate but an indication of the potential of the reaction to occur. All sites that combust organic compounds typically contain more than the stoichiometric requirement of hydrogen to combine with the 'free' chlorine in the combustion zone. Literature and data are available that support the greater likelihood of available free chlorine reacting to HCl than the reaction of free chlorine to Cl_2. As a result, CWM requests that the Agency require the use of a HCl monitor only, and that a limit be established for HCl, not HCl and Cl_2.

CEM4.021(170)(b) 3. CKRC believes there is no reason for Cl monitors to supplement HCl monitors because available data shows that the majority of the Cl_2 is caught in the acidic impingers. There is only a very small amount of Cl_2 gas. A monitor to verify this small amount would not provide added environmental benefit and is not cost effective.

CEM4.023(170K) Need for Cl_2 CEMs EPA also recommends the installation of both an HCl and a Cl_2 CEMS. The basis for this recommendation at cement kilns is not immediately apparent from the docket. When we look at the available data, even though it is contaminated with some unknown level of ammonium chloride interference -- generally between 50 and 100 percent based on ammonium anion analysis of the impingers -- Cl_2 is generally less than (5) percent of the total measured chloride. Consequently, it is not clear that any environmental benefit will result from imposing this additional monitoring requirement. If the extra CEMS increases the number of AWFCOs, then the benefits of using hazardous waste in cement kilns are minimized. EPA needs to carefully investigate this area and demonstrate that at least for cement kilns there is any benefit that could not be achieved by simply using a slightly lower "standard" when a HCl CEMS is employed or properly basing the HCl CEMs to provided a reasonable measure of HCl and Cl_2. Since Relative accuracy tests are passed if the monitor and reference methods are within 20% of each other, the presence or absence of Cl_2 is not even discernible.

CEM4.028(188) HCl/Cl_2 Standard OxyChem requests that in addition to proposing the use of a HCl continuous emission monitoring (CEMS) only, a stand alone Cl_2 CEMS should also be allowed as a surrogate for the HCl/Cl_2 standard.

Comment Summary

Commenters disagre on whether EPA should require HCl only, Cl_2 only, or both HCl and Cl_2 CEMS if a facility elects to use CEMS instead of feedstream and operating parameter limits for chlorine standard.

Response

EPA notes this disagreement and chooses not to act now. EPA has a preference that both HCl and Cl_2 CEMS be used, but understands how site specific matters may cause another approach to be better. EPA suggests facilities work out this issue with their permitting authorities before going ahead with any CEMS installation for compliance with the chlorine standard.

4. Performance Specification 13

Comment

CEM4.022(170K)(a) HCl MONITOR CONCERNS The EPA has under estimated both the potential adverse environmental impacts of the quality assurance requirements in TSD Vol. IV and the costs in TSD Vol. V.

Proposed Performance Specification 13 states that the HCl monitor shall have a response time of less than 2 minutes or the operator can apply for a variance. EPA should not set a realistic response time requirement for these systems.

The German performance standards for CEM certification are based upon the provisions of the BMU/UBA/LAI guidelines for certification testing [Footnote 13: Stahl, Helmut, 1992. "Measures to Assure Quality in Continuos Monitoring of Emissions". A paper contained in A Selection of Recent Publications (Volume 3) for the Federal Environmental Agency, Federal Republic of Germany, Berlin.]. These requirements were developed by VDI under the DIN system. In these documents, response time is specified as being less than 200 seconds (3 minutes and 20 seconds). Note the standard factory brochure for the Bodenseewerk MCS 100 states: "T90 - time typically less than 140 seconds".

This is shorter than response required by Performance Specification 13, which calls for a 95% full scale response time. Since the rate of response decreases as the final level is approached, the last 5% could take substantially longer than a straight linear decay suggests. Also, transport time through the umbilical from the stack to the analyzer must be added when over-board calibration at the sampling head is required.

The Institut fur Umwelttechnik und Energietechnik test report on the Certification of an MCS 100 system the states that the instrument is fulfilled the minimum performance requirements with a 10 m umbilical line and sampling filter.

The data in the report suggests that, of all the tests conducted to determine response time, the minimum value obtained was 84 sec. and the average was 140 sec.

Discussions with the manufacturer's personnel in Germany [Footnote 14: Personal communication letter from CEM Specialties to A. J. Chandler attaching comments for Dr. Breton of Perkin Elmer.] indicate that the MCS 100 HW uses a large sample cell to achieve the desired sensitivity for the gases of interest. The instrument is designed and tuned specifically for the Hot/Wet measurement principle and takes into account volumetric differences due to analysis at elevated temperature. Attempts to increase the sample flow rate to improve the response time place increased load on the electrically heated components within the system. Dr. Breton also mentioned that the design of the analyzer takes into account the 'high differential mode' of measurement to achieve the desired sensitivity and that the sample flow rate should not be tampered with. In order to meet the response time requirements it would be necessary to sacrifice system performance and raise the detection limit.

In testing another HCl system at a municipal waste combustor for response time revealed several peculiarities a dilution probe type HCl CEMs with a TECO GFC/IR analyzer. An increase in HCl concentration was read by the analyzer after the calibration gas flow ceased. Two potential explanations have been advanced for this performance:

- the action of the valve on the high pressure gas flow creates a pressure wave of positive and then negative sign that moves up the calibration gas line to the entry point into the probe. This has the effect of purging the calibration line and setting up a scrubbing action that removes the HCl attached to the wall thus raising the concentration for a short period of time.

- the calibration gas being cooler sorbs to the walls of all wetted surfaces in the sampling system until an equilibrium is set up. After the gas is stopped the surfaces re-heat and sorbed HCl is released to the gas stream - hysterisis affects.

Slower response times were measured for the dropping-concentration situation than for the step-change rising concentration frequently used in response time determinations. This has been attributed to hysterisis phenomenon releasing surface absorbed HCl during purging of the calibration gas and gas sampling lines.

These observations suggest that PS 4a (40 CFR 60) may not accurately characterize the response time of HCl CEMs the instrumented system under normal conditions. Long response times could be viewed as in clipping the maximum peak values in the system; however, this is unlikely to produce an HCl response that rises and falls in 2 minutes, or for that matter 15 minutes since these systems hold a time integrated sample in the analyzer cell.

For the Bodenseewerk HCl analyzer, the supplier provided an estimate of a likely response time. Starting from the minimum German T90 requirement of 200 seconds, allowances can be made for transport time in the umbilical and the calibration line. The transport time in the umbilical is a function of flow rate. The system's flow rate is governed by its configuration in that there are no flow control devices in the sampling line. The manufacturer matches the configuration, including length of umbilical and operating conditions, with the pump curve to provide a system that normally operates at the pump's maximum efficiency point while delivering an appropriate flow of gas to the analyzer. Various data suggest that this flow rate is between 7.5 and 15 lpm. If the umbilical has 8 mm ID tubing, the volume would be 0.05 liters per meter of length. The manufacturer's data suggests that the systems have been certified with 10 m of umbilical and the sampling head. For an installation requiring a 46 m umbilical, or 35 to 36 m more than in the certification document an additional 1.76 to 1.81 liters of sample line volume would be installed. This adds 12 to 14 seconds to the transport time at the low flow rate and 6 to 7 seconds at the high flow rate respectively.

Allowance for the calibration gas line decay is between 14 to 16 seconds given that the calibration line is 10 meters longer than the nominal sample line tested in Germany.

This suggests that a nominal response time will be around 230 seconds. To guard against failure due to unexpected occurrences, it is prudent to provide an allowance for error. This target response time to 4.5 minutes or 270 seconds.

Comment Summary

The commenter provided several suggestions for PS13, the proposed performance specification for HCl CEMS.

Response

As stated in issue 2 above in this section, and section 8 issue 1 of this volume of the Response to Comments Document, EPA has chosen not to promulgate PS13.